Rome and the Indian Ocean Trade from Augustus to the Early Third Century CE

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Rome and the Indian Ocean Trade from Augustus to the Early Third Century CE

By

Matthew Adam Cobb

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CHAPTER 1

Introduction

The Indian Ocean is a vast body of water covering over 70,000,000 square kilometres in its entirety. Its western side laps the coasts of East Africa, the Arabian Peninsula, southern Iran, Pakistan, and western India, while its eastern side stretches from eastern India in an arch to Southeast Asia. The western Indian Ocean also has important extensions in the form of the Red Sea and the Persian Gulf. In spite of its vastness, many diverse civilisations controlling its littorals have used this ocean as a conduit for the movement of peoples, goods and ideas. In its western half these movements can be detected as early as the third-second millennium BCE between the Sumerian (Mesopotamian) and Harappan (Indus Valley) civilisations.[1] This is attested in documents that record the transport of precious stones and ivory via intermediary lands such as Mekkan (Oman) and Telmun (Bahrain).[2] Later the Akkadian king Sargon boasted that ships containing ivory from Oman sailed directly to the riverbanks of his capital.[3] A second major phase of activity occurred in the early to mid-first millennium BCE, with the re-emergence of harbours and costal settlements on the Indian seaboard and along the Persian Gulf.[4]

The pharaohs of Egypt also sent expeditions across the Eastern Desert and down the Red Sea to a land they knew as Punt, an unknown location that probably conceptually shifted and expanded over time.[5] The earliest recorded expedition was one sent out by Sahura (2458–2446 BCE), and such ventures continued sporadically under later rulers like Mentuhotep III (2004–1992 BCE) and Hatshepsut (1508–1458 BCE).[6] Evidence for this activity includes material

1 H. Ray (1994): 12–17; Vogt (1996): 126–127; Moore and Lewis (1999): 52–58; Warburton (2007): 9–21; Smith (2009): 32–36; Beaujard (2015): 15; Salles (2016): 137; Gaur and Sundaresh (2016): 199. The beginning of trade contact across the Bay of Bengal seems to date around 1000 BCE—H. Ray (2015): 10. By the first century CE, if not earlier, Southeast Asia was linked into a wider Eurasian world economy—Chew (2015): 28, 31.

2 Oppenheim (1954): 13, 15—UET III 751.

3 Curtin (1984): 66; Oppenheim (1954): 7–16. See also Chew (2015): 34–36.

4 S. Gupta (2005): 212.

5 Sidebotham (2011a): 24. Pottery at the Pharaonic period site of Mersa Gawasis suggests trade contacts with cultures in Eritrea and possibly Yemen—Bard and Fattovich (2010): 1–13.

6 For Pharaonic expeditions see Curtin (1984): 71–73; Shaw (2000a): 316–317; Smith (2009): 41–45. Wainwright (1947): 143–144, suggests more regular contact.

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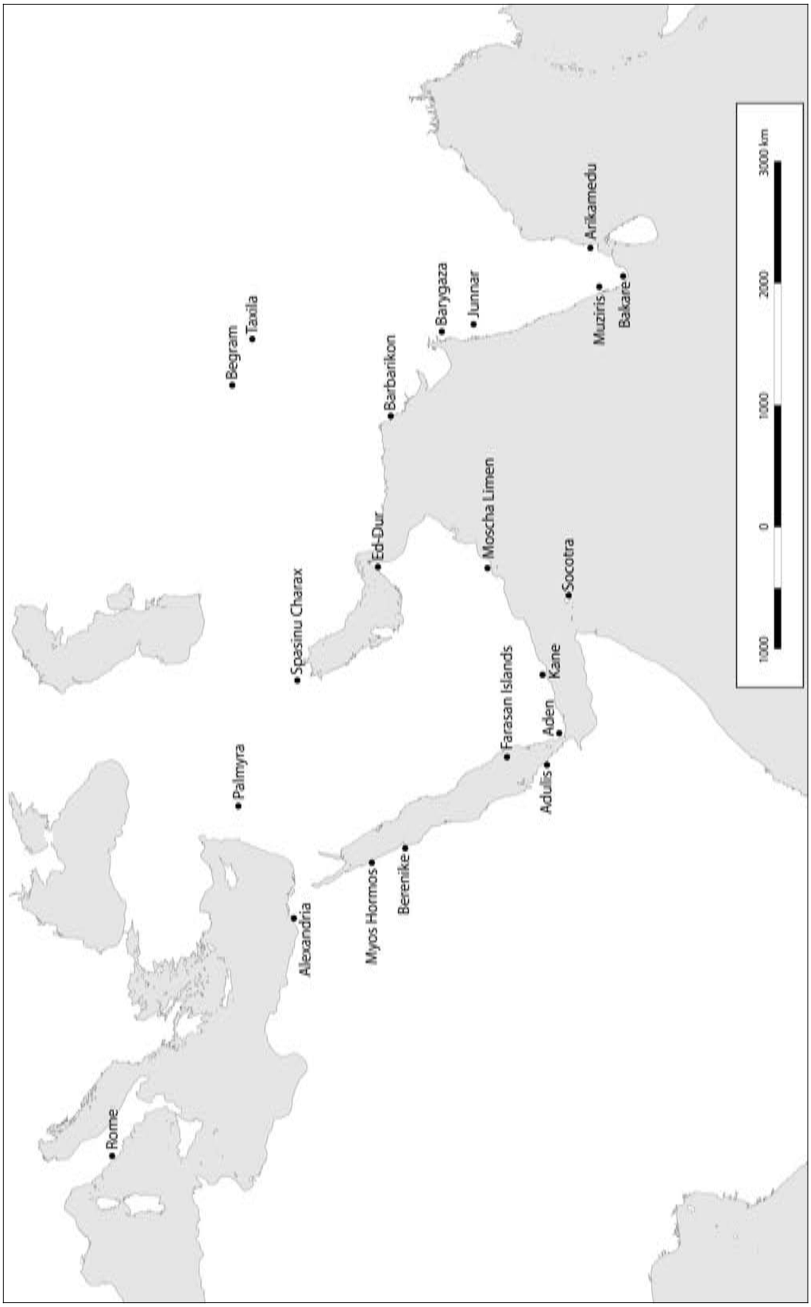

MAP 1 *Western Indian Ocean*

remains from the site of Mersa Gawasis on the Red Sea coast, and two recently discovered fragments of a stela of Amenemhet IV found in the Great (or Main) Temple in Berenike.[7] Besides the Egyptians, the Old Testament (early first millennium BCE) also speaks of a joint expedition by Solomon and Hiram of Phoenicia to Esian-Geber (East Africa and Arabia) and Ophir (India or possibly Southeast Asia).[8] By the fifth and fourth centuries BCE, ideas about these lands and their products had even filtered into Greek thought. Aeschylus made reference to the "Erythra Thalassa" (see below), Herodotus commented on various Indian tribes, Aristophanes alluded to Eudaimon Arabia (southern Arabia or the port of Aden); and by the early Hellenistic period Theophrastus could even distinguish between the plants producing black pepper (*piper nigrum*) and long pepper (*piper longum*).[9]

During the Hellenistic period (323–30 BCE), two of the major dynasties, the Ptolemaic and Seleucid, established themselves after Alexander the Great's death and gained access to the Red Sea and the Persian Gulf, respectively. Under these dynasties, Greek-speaking peoples gained the opportunity to explore these regions and increasingly engage in trade. The Seleucids established a colony on the island of Failaka in the northern Persian Gulf, which, to judge from the coin and amphora finds, probably acted as a meeting point for merchants from their empire and others, such as the Gerrahaean Arabs.[10] The extent to which merchants from the Seleucid Empire directly sailed to India or were dependent upon the Gerrahaeans as intermediaries is unclear.[11] In any case, by the end of the second century BCE the Parthians had taken over the northern shores of the Persian Gulf, which were subsequently controlled by the vassal kingdom of Characene.[12] In contrast, the Ptolemies maintained control

7 Bard and Fattovich (2010): 1–13; Hense, Kaper and Geerts (2015): 586, 596, 598.

8 Newby (1988): 33; Moore and Lewis (1999): 91–94; Smith (2009): 49. Josephus (*AJ* 8.6.4) associates Ophir with the Golden Chersonesos (Southeast Asia).

9 Aeschylus Fragment 67; Hdt. 3.98–106; Ar. *Birds* 144–145; Theophr. *On Plants* and *On Odours*. See also Eur. *Bacch.* 16–18. Data from shipwrecks shows that pepper was imported into the Mediterranean from the second millennium BCE—H. Ray (2015): 212. It has even been suggested that the image of a flute-playing snake charmer on an Apulian vase (fourth century BCE) indicates Italian contact with India—Cimino (1994): 125.

10 Salles (1987), 85, 87–88; Salles (1996a), 302–304; Salles (2016): 149–150; Sherwin-White and Khurt (1993), 65–66; H. Ray (1994): 55; Parker (2002): 70–71. For Rhodian amphorae and a Seleucid coin at Mleiha (Qatar) see Salles (1995): 125, 134; Tomber (2008): 112.

11 Salles (1996a): 295, suggests knowledge of the Persian Gulf resulted from Seleucid trade with India.

12 Salles (1995): 117; Potts (1996): 282.

of a portion of the north-western Red Sea coast (despite issues with Nabataean pirates), allowing merchants to trade as far afield as India by the late-second and first centuries BCE.[13]

Scope of the Book

These historical developments form the backdrop to the subject of this book: Roman involvement in the Indian Ocean trade from the reign of Augustus to the early third century CE, a period often referred to as the Principate. The logic behind this chronological demarcation is that the annexation of Egypt (30 BCE) by Octavian ("Augustus" from 27 BCE) ushered in a politically unified Mediterranean world. In this context, the following centuries saw significant levels of trade activity with a high point in the first century CE, followed by a downturn during the course of the second century. It was not, however, until the third century CE that levels of Roman activity reached a significantly low ebb. Certainly, not all merchants from the Roman Empire had ceased trading in the Indian Ocean by this point, and there was a substantial revival from the mid-fourth century CE. Nevertheless, the patterns of trade in this later period were somewhat different from those that preceded them: northerly ports in the Red Sea, like Clysma, became more significant; middlemen, like the Axumites, increased in prominence; the island of Sri Lanka had become a major hub; and Christianity was beginning to leave its mark.[14] It is wholeheartedly acknowledged that delineating the Principate phase from what preceded and followed it is problematic. As will be seen in Chapter 2, many features of the trade already established under the Ptolemies were continued and developed after the Roman annexation of Egypt, and, as noted, trade activity continued into the third century CE (albeit at a lower ebb). The latter is attested by inscriptions from Berenike, among other evidence. But ultimately all studies need defined parameters and the one adopted here seems as logical and coherent as any.

Since most Roman activity took place in the western Indian Ocean, the main geographic focus of this study lies on the regions of the Red Sea, the Gulf of Aden, and the Arabian Sea. These bodies of water were used to facilitate

13 For Ptolemaic activity in the Red Sea region and issues of Nabataean piracy see Desanges (1978): 243–305.

14 Nappo (2007); Seland (2012a) and (2012b); Power (2012): 19–59; Sidebotham (2014): 617–619.

exchanges between Egypt and the wider Mediterranean with East Africa, the southern Arabian Peninsula, and the Indian subcontinent.[15] Areas like the Bay of Bengal will, however, receive some treatment. When Greek authors used the term Erythra Thalassa, or Latin authors Mare Rubrum, they were usually referring not just to the Red Sea proper, but to the area encompassing the Gulf of Aden, the Arabian Sea, and in some instances the Persian Gulf and the Bay of Bengal.[16] These authors did not always use the term consistently. For example, Arrian referred to an Indian Sea, a Great Sea, and the Erythra Thalassa interchangeably.[17] He also described the myth of how the Persian king Erythra gave his name to the sea, seemingly placing the Persian Gulf among this group.[18] For this reason the modern term Indian Ocean is employed.

While this work focuses primarily on Roman participation in the Indian Ocean trade, it is necessary to stress that merchants from the Mediterranean world were not exclusively operating in the Indian Ocean. A whole range of peoples from East Africa, the southern Arabian Peninsula, Parthian territory (covering modern Iraq, Kuwait and Iran), and the Indian subcontinent were involved (among others). It should also be stressed that the term Roman merchant (or its variants) is often employed in this work as convenient shorthand for citizens and subjects of the Empire who had a commercial interest in the Indian Ocean region. They formed a wide variety of peoples with different ethnic and cultural identities but were, nevertheless, subject to the same central political authority. The term Mediterranean merchant is also used as a designation, especially when not referring exclusively to the Roman period.

Key Themes

The following chapters deal with various facets of Roman participation in the Indian Ocean trade, including the means by which it was organised, financed

15 In this book the term is used to refer primarily to India, Pakistan and sometimes Afghanistan; although the latter is technically part of central Asia. See Map 1.

16 For example, Agatharchides *On the Erythraean Sea*; Strabo 16.3.1; Pliny *NH* 6.26.103; *Periplus*; Sidebotham (1986): 182–186; Marcotte (2016): 163.

17 Arr. *Ind.* 38.3 (Indian Sea), 43.2 (Great Sea). 43.7 (*Erythra Thalassa*). Marcotte (2016): 181–183, claims the term Indian Sea became more common in the first and second centuries CE.

18 Arr. *Ind.* 37.3—in which the Persian Gulf is also referred to as the *Erythra Thalassa*; see also Agatharchides 1.5a = Photius, Cod. 250.5, 442a–422b.

and conducted (Chapters 3 and 5); the types of goods exchanged and their social and economic impact (Chapters 6, 7 and 8); the Roman state's taxation and oversight (Chapter 4); and the development and peak of the trade (Chapters 2 and 9). While these chapters are distinct units in their own right, many of them overlap in major thematic ways. The purpose is both to provide a series of overarching arguments and new perspectives and to challenge a number of long-standing theories.

Development of Trade

There has been a tendency in some scholarship to present the Augustan period as ushering in a new and distinct phase of Mediterranean involvement in the wider Indian Ocean trade. This is not only in terms of the volume of goods exchanged, but also in how the trade was conducted. It is argued here that this theory is in need of modification. Many of the Red Sea ports, routes, and trade networks utilised by Mediterranean merchants had their origins in the Ptolemaic period and would be subsequently expanded in the Roman period (Chapter 2). It is also argued that the Alexandrian financiers and the Graeco-Egyptians merchants who conducted the trade were not displaced by Italian merchants. They continued to be heavily involved in the trade, and while other groups did increasingly participate, this was not an entirely novel development (Chapter 5).

Barter and Bullion

Despite the lack of statistical data on the cost and volume of Rome's Indian Ocean trade, it has repeatedly been claimed that the demand for Mediterranean goods in various eastern societies, especially in southern India, was limited. As a result, many have asserted that Roman merchants acquired most Eastern goods through the exchange of precious coinage. However, written and archaeological evidence reveals that a wide variety of goods were both imported and exported, from raw materials and foodstuffs to lightweight costly items. In fact, an examination of the archaeological evidence suggests that various Mediterranean crafted wares (especially bronzes and glassware) were appreciated in India (Chapter 7).

A re-examination of Pliny's claims regarding the export of millions of *sestertii* from the Roman Empire (50 million to India alone, and 100 million to India, Arabia, and the Seres combined) indicates that these figures cannot be used to substantiate the idea of a mass outflow of gold and silver. Even if they did, the amount of space taken up on most Roman merchant ships operating in the Indian Ocean would have been negligible. Of necessity, most of the space in a cargo hold was taken up by goods in kind (or at least non-saleable ballast), and

the need for correct stowage meant that many of these products should not be seen as mere space-fillers, but high-quality items demanded in their own right (Chapter 8).

The Peak Period of Roman Trade

The period under study in this book runs from 30 BCE to the early third century CE, but this does not mean that the levels of trade within this period remained consistent. There were broad upsurges and downturns (and no doubt annual fluctuations), although there is no consensus on when these took place. Some argue, on the basis of numismatic evidence and references to Roman consumptive habits in Graeco-Roman literature, that the Julio-Claudian period saw a peak in trade (Chapter 7), while others argue that it remained strong and steady until the latter second century CE, when events like the Antonine Plague caused a significant downturn (Chapter 9). Based on examination of the archaeological and numismatic evidence, it is argued here that the first century CE, especially the latter first century, actually represents the peak of Roman participation in the Indian Ocean trade, and that the early second century CE saw the start of a downturn (Chapter 9). A view that has been advanced more recently.[19]

Schedules, Practicalities and Roman Diasporas

Many features of Mediterranean trade, such as the use of agents, maritime loans, business partnerships, and methods of vessel construction, were also employed by Roman merchants in the Indian Ocean (Chapter 5). At the same time, it was necessary to adapt to the conditions of this ocean, most notably to the seasonal monsoons that impacted on timing and directions of travel. These patterns usually meant that it was possible to conduct a season's trading between Egypt and ports in East Africa, southern Arabia, and India within a year. However, the western Indian Ocean and the Mediterranean were two separate trading spheres, and it is likely that the volume of goods exchanged between these spheres fluctuated annually, potentially due to factors such as piracy, banditry, bureaucracy, corruption, and losses at sea (Chapter 3).

The restricted sailing schedule imposed by the monsoon winds likely encouraged some powerful financiers and merchants to leave behind agents or partners in major foreign emporia. They could engage with local contacts, gather useful information, and assemble goods in advance. However, some

19 Cobb (2015b): 362–418. See also Sidebotham (2011a): 63, 124, 218–224 (especially in relation to Berenike).

of the evidence cited as examples of such "diasporas" must be treated with more caution, especially the references to Yavanas in Indian texts and inscriptions, where the identification is open to question. The interpretation of Roman material finds in India relating to this debate also warrants more caution. In fact, it could be argued that there is currently firmer evidence for the presence of Arabian and Indian merchant communities in Egypt than vice versa, although evidence for the latter is not absent (Chapter 5).

Indian Ocean Goods and Roman Society

Many Indian Ocean goods played an important role in competitive displays of status in Roman society, and, conversely, were also discussed in relation to longstanding moralising discourses on traditional Roman values and concerns about the financial stability of some elite households. However, the simple categorisation of these Indian Ocean imports as "luxuries" is problematic. Examination of the literary sources will show that these goods were used in many complex and multifaceted ways that defy singular and definitive categorisation. It is also apparent, as a number of scholars such as Young, Sidebotham and McLaughlin have noted, that some of these imports, particularly spices and aromatics, were probably quite widely consumed, raising a whole series of questions about the scale and significance of the trade (Chapter 6).

Scholarly Developments

The last five centuries have seen an exponential increase in the available body of material with which to study the Indian Ocean world of the late first millennium BCE to the early first millennium CE. The earliest editions of the *Periplus Maris Erythraei*, a mid-first century CE guide on trade in the Indian Ocean, became publically available in the sixteenth century, which, coincidentally, was a period of increasing European activity in the region.[20] The fifteenth and sixteenth centuries were also periods when surviving manuscripts containing classical geographical works began to be printed, like Claudius Ptolemy's *Geographia* (the first print edition dates from 1475). The *Tabula Peutingeriana*, or Peutinger Table, a copy of a late antique map of the *oikoumenē* (the inhabited or known world), was also published in full in 1598.[21] By the late eighteenth

20 Schoff (1912): 17–19; Casson (1989): 5–6; Cimino (1994): 9.

21 Wheatley (1961): 160; S. Gupta (2005): 212–213. For a detailed discussion on the transmission, discovery and publication of the Peutinger Table see Talbert (2010): 10–73.

and nineteenth centuries, surveys began to appear which attempted to identify the ancient ports named in classical and Indian literature.[22] Around the same time, European historians became increasingly engaged in drawing parallels between Roman interests in the Indian Ocean and the activities of contemporary trading companies.[23]

During the eighteenth and nineteenth centuries the East India Company, and subsequently the British Crown, progressively took control of substantial portions of the Indian subcontinent. It was in this context that discoveries of Roman coins in India began to be recorded by Western scholars and political authorities, although much evidence has been lost to plundering and recycling over the centuries.[24] Nevertheless, the corpus of numismatic evidence increased and, in the best cases, records of provenance and condition were made. Furthermore, the Eastern Desert of Egypt became subject to antiquarian and archaeological surveys from the time of the Egyptian campaign of Napoleon onwards. This brought inscriptions and graffiti relating to the Indian Ocean trade to the attention of scholars.[25]

Consequently, by the early twentieth century, a range of literary, numismatic, and epigraphic material was available to work with, although archaeological finds were yet to make a significant impact. This period saw a number of scholarly works appear that dealt with Roman involvement in the Indian Ocean trade, including Mookerji's *A History of Indian Shipping and Maritime Activity* (1912), Rawlinson's *Intercourse between India and the Western World* (1916), Charlesworth's *Trade-Routes and Commerce of the Roman Empire* (1924), and, perhaps most importantly, Warmington's *The Commerce between the Roman Empire and India* (1928). The latter work would become seminal in the field, and although much new evidence has come to light since its publication, many scholars continue to repeat a number of the conclusions made by Warmington.

Warmington is praised by Suresh for being the first modern scholar to correlate numismatic data in India with the account of the *Periplus Maris Erythraei*.[26] It could, however, be contended that his treatment left much to be desired. Most notable is his use of insufficient literary testimony to claim that Roman coin finds in southern India represented an attempt to create a currency by Roman merchants—a theory adopted by later scholars like Miller and

22 S. Gupta (2005): 213–214; Seland (2014): 368–369; Gurukkal (2016): 91.

23 De Romanis (2015a): 1–4.

24 Turner (1989): 1–4.

25 Weigall (1909); Murray (1925): 138–150; on earlier travellers see A. Bernand (1972): 21–37, 59–74; Cuvigny (2006a): 14–18.

26 Suresh (2004): 16.

P. Gupta.[27] Often, in order to construct elaborate theories, separate literary texts were melded together and their limits overlooked. Notable among these theories is Warmington's attempt to reconstruct stages in the "discovery" of the Indian Ocean monsoon winds—a pitfall not entirely escaped in more recent times.[28]

Many early twentieth century scholars adopted what could be termed a "modernising" approach to the study of Graeco-Roman economics and trade, as encapsulated in the work of Rostovtzeff. This approach to studying the ancient Roman economy emphasised the quantitative rather than qualitative differences with later European industrial economies.[29] Coupled with this was a tendency to portray Indian Ocean commerce as an extension of government policy, in which diplomatic efforts and military campaigns were used to benefit Roman merchants. In this context, Charlesworth portrayed Rome's trade with India as a product of national hostilities and competition between different ancient states. He asserted that the emperors fostered the sea-route in order to bypass the Parthians and Arabs, while also claiming that Vespasian's frugality discouraged the excessive import of goods.[30] Warmington followed similar lines drawing parallels with later European involvement in the Indian Ocean and also arguing that Vespasian attempted to limit the export of silver. Furthermore, he—anachronistically—criticised Roman "failures" to develop industries from this long-distance trade and apply capitalist methods.[31]

Modern scholarship has tended not to express these theories so overtly, but the notion of circumnavigating Rome's enemies and fostering trade via the Indian Ocean is an idea that still has some force.[32] With regard to the Roman state directing its military and diplomatic policy to advancing commercial interests, a more nuanced and balanced approach has been recently adopted by Speidel. He argues that the Roman state's attempts at dominating the Red Sea and developing diplomatic relations were undertaken to ensure legal protection for its merchants in foreign ports.[33] The latter proposition has some merit, but as demonstrated in Chapter 4, rests on a weak evidential basis.

27 Warmington (1928): 274–285; Miller (1969): 217; P. Gupta (1991): 125.

28 Warmington (1928): 43–47. See also Wheeler (1954): 127; Fraser (1972): 183–184; P. Gupta (1991): 123; Parry (1999): 217.

29 Morley (2004): 35–37.

30 Charlesworth (1924): 33–34, 61–63, 73, 225; this idea is also briefly restated by S. Gupta (2015): 212.

31 Warmington (1928): 293, 315.

32 See notably Sidebotham (2011a): 13; and also S. Ray (1991): 138.

33 Speidel (2015): 83–128.

There was also a tendency in nineteenth and early twentieth-century scholarship to make broad nationalistic and ethnic generalisations. Merchants from a particular ethnic group were often spoken of as acting as part of a collective. For example, Warmington spoke of the Arabs jealously guarding "secret knowledge" of the monsoon winds. He also attributed what he saw as the passive involvement of Indians in this trade as a reflection of their conservative character, contrasting this with the supposed dominance of Western merchants in the transit of goods.[34] These types of sentiments were both a product of the period in which they were written and were perhaps the result of a greater reliance on Graeco-Roman literary testimony.

In the post-colonial context of the latter twentieth century, there was a reaction against these types of attitudes. Most notable is the work of Edward Said, which highlights what he saw as the generalised, pseudo-scientific, and often negative notions of an Eastern Other present in much Orientalist scholarship of the nineteenth and early twentieth centuries—a portrayal that partially has its roots in classical and medieval thought.[35] In the last half-century, such blatant generalisations about ethnic characteristics have tended to be avoided, but the view of the Romans as the more proactive partners has continued both implicitly and explicitly. For instance, Miller (1969) has argued that it was necessary for Roman coins to be exported to some regions of India to create a precious metal currency with which Romans could trade. However, it is now clear that many regions of India, including the far south, did in fact have well-developed coinage systems.[36] A few decades back, Meyer argued that the Indian kingdoms lacked the resources to engage in long-distance commerce, while recently McLaughlin has speculated that Indians and Arabians who did not own their own vessels probably travelled aboard Roman ships with their own merchandise.[37]

The strongest reassertion of the idea that Roman merchants were the proactive partners, particularly in relation to southern India, has been made by Gurukkal. Utilising anthropological theories of exchange and focusing on the

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34 Warmington (1928): 10–11. The latter idea is expressed by Lindsay (1874): 130, who asserted that Egyptians and Indians were not seafaring peoples. See also Wheeler (1954): 1; Adhya (1966): 136–137.

35 Said (1978): 21, 31–32.

36 Miller (1969): 217; also Warmington (1928): 274–285. On Indian currency systems see H. Ray (1994): 44–47.

37 C. Meyer (1992): 71; McLaughlin (2010): 39. Likewise Nappo (2007): 233, describes the Romans as the dominant force in East-West trade after 30 BCE; while Raschke (1978): 645, suggested that Roman vessels were more seaworthy.

concept of political economy, he argues that southern Indian societies (those in the Tamilakam) lacked the complex state structures necessary to facilitate its inhabitants taking a proactive role in long-distance market exchanges. He further asserts that these local societies would not have conceived of trade, but lived in cultures emphasising gift exchange.[38] Gurukkal seems to have followed Rostovtzeff, Jones, and Finley in marginalising the significance of the role of trade in ancient world economies.[39]

The problem with these ideas is that they downplay the existence of Indian trade networks prior to the Roman period. They also underrate the well-developed seafaring technology and local currency systems that existed in different regions of India.[40] Furthermore, it is questionable whether the operation of this trade should be seen as so dependent upon levels of "political sophistication". For example, fishing communities seem to have been quite important to the development of maritime activity in the Indian Ocean.[41] Certainly members of the elite in Indian societies possessed resources that would help them organise and fund trade ventures. However, the onomastic evidence from the Hoq Cave on Socotra indicates that individuals of varying status were involved, including those belonging to *kshatriya* (noble), *vaishya* (merchant), and *sudra* (servant) castes.[42] Indeed, Buddhist literature reveals that various individuals were engaged in trade in the early centuries of the first millennium CE, many of whom made substantial donations to monastic establishments. Likewise, a number of the inscriptions in the Hoq Cave show implicit and explicit connections to Buddhism.[43] Thus, Gurukkal's theories should perhaps be reassessed.

In the 1930s to the early 1940s, Arikamedu (likely ancient Poduke) was discovered and explored by Jouveau-Dubreuil. Subsequent excavations at this port

38 Gurukkal (2013); Gurukkal (2016). Not directly responding to Gurukkal, but offering an alternative perspective, see Evers (2016): 201–238. See also Sidebotham (2017a): 426–428, for a strong critique of Gurukkal's work. Additionally Chakravarti (2015): 333–338.

39 Gurukkal (2016): 14, 237. Jones (1974): 30; Finley (1999).

40 Hall (1999): 433–434 (indigenous coinage); H. Ray (1995b): 100–101 (Indian seafaring). See Chapter 5.

41 H. Ray (1994): 36–40, 49; H. Ray forthcoming.

42 Strauch (2012): 358–360.

43 H. Ray (2015): 106—*Jatakas* Book XXI no. 539. On the role Buddhist *sangha* played in Sri Lanka in acquiring and administering resources, including from trade, see Coningham et al. (2013). For political endowments to religious communities in the Tamilakam and Western Deccan regions see, Evers (2016): 230–233. On the Hoq Cave see Strauch et al. (2012); Strauch (2012): 259–260; Strauch (2016): 84–87.

site south of Pondicherry (Tamil Nadu), first by Wheeler and then by Casal, revealed significant amounts of Roman material. It provided the most important concentration of Roman ceramics in India until the recent discoveries at Pattanam, Kerala (probably ancient Muziris, or at least a satellite settlement).[44] The uncovered material encouraged Wheeler to assert that Graeco-Roman merchants resided at Arikamedu.[45] However, re-evaluation of this material by Begley, as well as subsequent excavations in the 1990s, have overturned many of Wheeler's interpretations. Some of the ceramics previously thought to be Mediterranean, including Red Polished Ware and Rouletted Ware, have, in fact, been shown to be Indian wares.[46]

Even with the discoveries made at Arikamedu, it could be argued that it was not until the late twentieth and twenty-first centuries that the evidence provided by archaeological excavations would substantively impact on the study of the Indian Ocean trade in antiquity. A case in point is Miller's *The Spice Trade of the Roman Empire 29 B.C. to A.D. 641* (1969). His work provides a comprehensive presentation of botanical references in ancient literary sources relating to the spice trade, using etymology as his main method for assigning origins to certain spices. Miller's textual approach derived, in part, from the fact that he had insufficient archaeobotanical evidence which he could compare to the literary testimony. This has begun to change with more recent excavations at the Red Sea ports of Egypt, as seen from Capper's *Roman Foodprints at Berenike* (2006) and Van der Veen's *Consumption, Trade and Innovation* (2011).

Many criticisms can be made of Miller's unsupportable and exaggerated interpretations of the literary sources, including his assertion that the *Periplus Maris Erythraei* was a semi-official or restricted document, concerned with foreign affairs and public revenues. No reading of the text could substantiate such claims. Miller also claimed that Pliny 'recognised the wisdom of Nero's devaluation of the currency as a means of checking the export of treasure needed to finance the eastern trade', yet he cited no passages which directly supported or even vaguely implied that Pliny held these views.[47] Some very recent scholars have even repeated this baseless assertion by stating that Vespasian tried

44 For the port of Muziris see Shajan et al. (2004): 312–320; Cherian et al. (2009): 236–240. On recent arguments about the identification of Pattanam see, Malekandathil (2015): 347–348; Mathew (2015): 18–19; Selvakumar (2015): 285–289; Gurukkal (2016): 166–167.

45 Wheeler, Ghosh, and Deva (1946); Wheeler (1951); Wheeler (1954).

46 Begley (1983): 461–481; Begley (1988): 427–440; Begley (1996c); Begley (2004c).

47 Miller (1969): 18, 20. Similarly Cimino (1994): 28; and McLaughlin (2010): 169; McLaughlin (2014): 192.

to ban the export of precious metals.[48] Another of Miller's claims was that an imbalance of trade was created because of the lower purchasing power of the Indians.[49] These assertions obscure the complex variety of independent societies and kingdoms that existed in India, and ignore the trade of goods in kind. Furthermore, he presupposed that Roman merchants demanded cash payments (in Roman currency) for their goods. If not engaging in barter, some Roman merchants may well have sold their goods, but probably for local and not Roman currency, which could then have been used to purchase desired items.

A more critical approach to the literary sources was taken by Raschke, who, in an article entitled 'New Studies in Roman Commerce with the East' (1978), argued against the synthesis of 'fantasy and statistics, romance, and economic theory.'[50] He was referring in particular to the credence given to Pliny's statements about the 50 and 100 million *sestertii* annually being spent on goods from Arabia, India, and China.[51] Raschke's more sceptical view on quantifying the trade can be seen in the wider context of "primitivist" theories about ancient economics, as popularised by Finley in the 1970s. He questioned whether the numismatic evidence really reflects an imbalance between the Roman Empire and India, since proponents of this view often fail to take barter and non-coined bullion into account. However, he did not reject the notion of an imbalance of trade per se, but simply doubted the statistical value of Pliny's figures, proclaiming Miller's use of them as 'inept'.[52]

Raschke's scepticism also extended to the notion that the Roman government undertook policies to benefit its merchants in the Indian Ocean.[53] He was followed by Young who saw the Roman state as essentially reactive and mainly interested in taxing the trade. Casson went even further, arguing that the facilities maintained by the Roman army in the Eastern Desert were primarily to serve the major quarries and of merely incidental benefit to merchants travelling to the Red Sea. This belief was partially based on the assumption that Abu Sha'ar was Myos Hormos, now known to be untrue.[54] However, not every-

48 Smith (2009): 97–98; Chew (2015): 42.

49 Miller (1969): 222.

50 Raschke (1978): 605.

51 Pliny *NH* 6.26.101, 12.41.84.

52 Raschke (1978): 632–665, 677, 767 n. 530. Finley also questioned the veracity of Pliny's figures—Finley (1999): 132.

53 Raschke (1978): 622, 641.

54 Casson (1989): 38. See also H. Ray (1994): 65; Schörle (2008): 50. That Abu Sha'ar is not the site of ancient Myos Hormos became clear from fieldwork conducted by the University

FIGURE 1 *Myos Hormos panorama*

one rejected the idea that the Roman government took an interest in the Indian Ocean trade. Sidebotham, in his *Roman Economic Policy in the Erythra Thalassa 30 B.C.–A.D. 217* (1986), argued that members of the imperial family may have had commercial interests in the Red Sea through freedmen agents: a controversial idea, but one that is not entirely impossible (Chapter 4).[55]

Less controversially Sidebotham put forth two other ideas that have received wider acceptance. The first held that many imports, specifically spices and aromatics, were regarded as necessities by many Romans for the role they played in culinary, medicinal, religious and funerary practices—in contrast to the commonly held view that Roman trade in the Indian Ocean was one of luxuries. However, as will be argued in Chapter 6, the simple label of luxury or necessity often fails to capture the multiplicity of uses and interpretations of these goods. The second argument challenged the assumption that the Roman government suffered an imbalance of trade with the East. Sidebotham noted that

of Delaware in 1987 and 1990—see Sidebotham et al. (1989); Sidebotham, Zitterkopf and Riley (1991).

55 Sidebotham (1986): 45, 48–68, 176.

FIGURE 2 *An excavated trench at Myos Hormos*

much wealth would have remained in the hands of financiers, merchants, and the government (through taxes).[56] Emphasis is rightly placed on reinterpreting Pliny's figures of 50 and 100 million *sestertii* in the context of Stoic moralising about luxury (Chapter 8), although some still argue for their veracity when attempting to calculate the (hypothetical) cost of the Indian Ocean trade to the Roman Empire.[57]

Alongside a more critical treatment of the literary sources, the study of the Indian Ocean trade has been significantly advanced by archaeological work undertaken in the last three to four decades in Egypt, East Africa, the Arabian Peninsula, and India (among other regions). One of the most important developments from the perspective of Roman interests in the Indian Ocean is the work undertaken at the two main ports on the Red Sea coast, Myos Hormos and Berenike. The former site is now firmly identified with modern Quseir al-Qadim and was initially excavated in 1978, 1980, 1982, and again between 1999 and 2003. The latter site, located on Foul Bay (several kilometres south of Ras Banas), has

56 Sidebotham (1986): 176, 180.

57 Young (2001): 205, 210; Parker (2008): 183–184.

also been subject to excavations between 1994 and 2001, and more recently since 2008, by American-Dutch and American-Polish teams. The routes that cross the Eastern Desert and link these two ports to the Nile emporium known as Koptos (modern Qift) have also received attention, especially as a result of work done by the Institut français d'archéologie orientale (IFAO). The fortlets (small forts) lining these routes have produced a useful range of material and written evidence that shed light on the conditions in the Eastern Desert in the Roman period.

Outside the territories once formally controlled by the Roman Empire, a whole host of international sites have revealed Mediterranean material that demonstrates trade links. Who moved this material, how many times it changed hands, and who it belonged to by the time of its final disposition are questions that cannot always be answered. However, this material does highlight the extent of its distribution, and in some cases its chronology. A number of important sites with connections to the ancient Indian Ocean trade have been subject to recent fieldwork. This includes Eritro-British and Eritro-Italian work at the site of ancient Adulis; excavations in the 1990s at Qana' or Qāni (probably the Kane of the *Periplus Maris Eythraei*, a few kilometres away from modern Bir ʿAlī); recent work at Khor Rori (probably the Moscha Limen of the *Periplus Maris Eythraei*); and ongoing excavations at Pattanam (ancient Muziris). These locations have revealed much Roman and non-Roman material relating to the Indian Ocean trade. In the case of Pattanam fragments of Roman ceramics have been discovered on a scale not matched in previous excavations in India.[58]

With such increased volumes of archaeological material available for analysis, a number of surveys have appeared. These have sought to provide an overview of new material as well as a reappraisal of previously studied material. For example, Tomber has shown that some amphorae previously thought to be late Roman are in fact Mesopotamian Torpedo Jars.[59] Suresh, in his *Symbols of Trade* (2004), likewise sought to collate lists of Roman ceramics, coinage, and crafted products (bronzes, glassware, jewellery) found in India. He also discusses objects once thought to be Roman that are actually imitations. More recently, de Saxcé (2015) has discussed the imitation of Roman objects by people living in Early Historic South Asia. The range of material, the various locations in which it has been discovered, and the challenge of correctly interpret-

58 See Shajan et al. (2004); Abraham (2009); Cherian et al. (2009); Selvakumar, Shajan, and Tomber (2009).

59 Tomber (2007): 972–988.

ing it have encouraged collaboration between scholars from a variety of disciplines (ancient history, archaeology, epigraphy, papyrology) and subject areas (Classics, Indology, Near-Eastern studies). These collaborative efforts have been published in several works, such as *Athens, Aden and Arikamedu* (1995), and most recently in *Imperial Rome, Indian Ocean Regions and Muziris* (2015). This collaboration has also extended to areas such as the diffusion of technology, cultural traditions and the transmission of flora and fauna.[60]

In the context of this long scholarly tradition, this book aims to reassess earlier conclusions and to offer new arguments (outlined above) about the nature of Roman participation in the Indian Ocean trade. This is particularly important in light of recent and ongoing archaeological work at a number of sites with new material frequently being unearthed. However, of equal importance is the need to challenge a number of long-running theories and assumptions about the trade that have reappeared in modified or unmodified form over the decades. As just outlined, these often have their origins in the nineteenth and early twentieth centuries. Many of these assumptions are unjustifiable on the basis of the available evidence.

Approaching the Evidence

The study of the Indian Ocean trade requires dealing with a wide array of evidence including material remains, inscriptions, graffiti, ostraka, papyri, and various genres of literary texts. This evidence encompasses a broad geographical and chronological range. This can be beneficial as it allows for different aspects of the trade to be highlighted and understood in their own particular contexts. The various categories of evidence are also a point of strength, as there is less reliance on one main source that is merely complemented by other evidence.[61] However, there is the danger of potentially problematic evidence being used to support conclusions drawn from other evidence when this may not be warranted. This is notably the case when examining the archaeological evidence relating to the presence of Roman "merchant colonies" in India (see Chapter 5). It is important that each piece of evidence is assessed on its own merits, and that, when different types of evidence conflict, proper justification is given for the conclusions drawn. Some consideration of these issues is set out below.

60 For example, Ray and Salles (1996).

61 Young (2001): 13–14.

Archaeological Evidence

Archaeological excavations have been conducted at various international sites at different times in the twentieth and twenty-first centuries. Invariably, this means there are deviations in the approaches taken and levels of detail recorded. Suresh has noted that many earlier excavators working in southern India frequently focused on the recovery of antiquities and not so much on settlement patterns and trade. Moreover, proper care has not always been taken to record stratigraphy. Evidence from many sites remains unpublished, and of the dozens of sites where Roman amphorae fragments have been identified, not all reports mention quantities.[62]

The extent of work undertaken in different regions is also uneven. East Africa, excluding the Egyptian Red Sea, is perhaps least represented. Consequently, attempts to draw quantitative conclusions about the volume of trade to or within a particular region are highly problematic.[63] For example, the sites of Taxila (Pakistan) and Begram (Afghanistan) have revealed great quantities of glassware, whereas other sites across central and southern India have revealed interesting, but less numerous, finds.[64] The circumstances of the Begram finds—a mass of objects sealed together in two rooms—were highly fortuitous. Nevertheless, at the very least, the presence of archaeological material is likely to suggest some level of demand at a particular site (excepting accidental loss).

Comparing material at individual sites is less problematic, since excavations conducted by the same team should, in theory, offer a degree of consistency. This opens up the potential for quantitative comparisons of the material within the sites themselves. For example, at the site of Qanaʾ (Yemen), the quantity of Roman pottery in the different strata shows the intensity of contact at different periods.[65] Of course, conditions are not always perfect: disturbed material can make it difficult to determine stratigraphy, and it may not always have been possible to access the earlier phases of a site. Furthermore, it is important not to draw sweeping conclusions based on sites which have revealed only small

62 Suresh (2004): 21, 89, 99, 101, 181–182; H. Ray (2010): 10, states that about 55 sites in India have revealed amphorae. See also Sidebotham (2011a): 233 n. 119 for estimations by different scholars.

63 Similar issues beset quantification of the archaeological material in the Roman Empire—see Wilson (2009): 214; for general issues around quantification see Bowman and Wilson (2009b): 7–15.

64 Suresh (2004): 134–136; See Chapter 7.

65 Sedov (1996): 11–35.

amounts of material. For instance, Huntingford believed that Ras Hafun could be identified with the ancient port of Opone mentioned in the *Periplus Maris Erythraei*, but Smith and Wright are sceptical, given the very limited quantity of Roman material discovered.[66] Additionally, problems can arise from misattribution. For example, pottery sherds found at some sites in India have been erroneously identified as deriving from Roman amphorae.[67]

Different types of material finds also pose their own difficulties. Unsurprisingly, pottery is found frequently, whereas metals tend to get recycled.[68] Organic materials are also underrepresented due to natural decay, except where special conditions help with preservation. Hyperarid conditions at Myos Hormos and Berenike have allowed some types of organic materials to survive, including charred or desiccated plant remains and textiles.[69] Archaeobotanical remains can also survive in waterlogged (anaerobic) conditions, as is the case with some organic material at Pattanam and with peppercorns found in north-western Europe (Germany, Britain, and France).[70] Furthermore, sites like Pompeii, Herculaneum, and Londinium have revealed black pepper finds in a mineralised form.[71] These processes tend to favour compact dry parts of plants, and this is why nutshells, seeds, stem fragments of woody plants, and fruit stones are usually found. The more fragile parts of plants tend to be underrepresented, particularly petals, leaves (e.g. nard leaf, malabathrum, cinnamon), and liquid secretions (resins, gums, and oil). For these materials, it is usually necessary to rely on written evidence, and so it is possible that their importance to the trade may have become underestimated.[72]

Faunal remains from various archaeological sites can also help advance our understanding of the Indian Ocean trade. The remains of worked materials at ports like Myos Hormos and Berenike provide direct attestation of the import

66 Huntingford (1980): 26, 94; Smith and Wright (1988): 115, 138–140.

67 For reassessments of pottery previously erroneously identified see Tomber (2007a); Tomber (2008).

68 *Periplus* 28, 49, 56.

69 Wendrich (2000): 250; Van der Veen (2011): 16, 18.

70 Schwinden (1983): 22; Kučan (1984): 52–55; Kreuz (1995): 70; Küster (1995): 137; Jacomet and Schibler (2001): 65–66; Cowan et al. (2009): 115; 119; Livarda (2011): 149–150; Sidebotham (2011a): 224–227.

71 Robinson and Rowan (2015): 105–106. Ciaraldi (2007): 49–51; Livarda (2011); Sidebotham (2011a): 224–227. Mineralisation is particularly enabled in calcium and phosphate rich environments.

72 Cappers (2006); Van der Veen (2011). For Frankincense gum found at Berenike see Zieliński (2011): 61–62.

of products like ivory and turtleshell into the Roman Empire.[73] Materials like animal bones can be utilised in relation to practical aspects of the operation of trade, such as the crafting of cattle horns to make brail rings.[74] Furthermore, animal remains can tell us about the diets of those of living and working at ports like Berenike.[75]

Epigraphic and Papyrological Evidence

Surveys, excavations, and chance discoveries have made available a whole host of written evidence for the study of the Indian Ocean trade and aspects relating to it. This includes writings on papyri and ostraka, inscriptions, and graffiti. Sometimes these written records include information directly or indirectly revealing the date on which they were created. In other cases, it is necessary to judge from the archaeological context or to use palaeographic methods to come up with approximate dates. In the case of the ostraka from the rubbish dumps at Maximianon and Krokodilo explicit dating, palaeographic analysis and the context of the finds all help to date these documents to the reigns of Trajan and Hadrian.[76] Broadly speaking it is often possible to classify these records into two groups; on the one hand, functional and utilitarian documents, on the other, records set up to convey messages to a wider audience.

The first group largely concerns the transmission of factual information about people, objects or events, and unless specific reasons exist to suspect deliberate misrepresentation or gross error, the information can generally be taken at face value. An example within this category is the Nikanor archive, a collection of ostraka found at Koptos which relate to the transport business of Nikanor and his family.[77] These ostraka provide receipts confirming the delivery of goods to individuals based at either Myos Hormos or Berenike. Similarly, a collection of about 250 ostraka from Berenike was discovered in the 1994–2001 excavation seasons, of which large numbers (dating largely to the mid-first century CE) served as receipts letting individuals bring certain goods through customs (henceforth referred to as the Berenike customs passes).[78] These rep-

73 On this evidence see, among other scholarship, Hamilton-Dyer (2011) and Van Neer and Ervynck (1998).

74 See Whitewright (2007b); Whitewright (2008).

75 Among other scholarship see Osypińska (2011).

76 Cuvigny (2005): 1; Brun (2006a): 61–71.

77 For the Nikanor archive see Tait (1930)—*O. Petr.* 220–303. See also *O. Ber.* 212.

78 For these ostraka see Bagnall, Helms and Verhoogt (2000b); Bagnall, Helms and Verhoogt (2005); Bagnall (2005). These passes are quite formulaic (see *O. Ber.* 185–188)—Nappo and Zerbini (2011): 63–65. Additional ostraka (and papyri) have been discovered in the 2009–

resent ephemeral, practical documents, of which there is no reason to doubt the information they contain about the goods transported and the individuals involved.[79] On the other hand, such documents can lack contextual detail, notably the precise nature of the recipients' interests; in the case of the Nikanor archive, it can be difficult to distinguish between commercial goods and supplies. These details would have already been known to the parties involved, making it therefore unnecessary to state them.

The second group, where the purpose is to convey a message to a wider audience, can be illuminating, not only in terms of the actual text itself but also of what it says about the author(s) or commissioner(s). For example, one inscription advertising the involvement of two wealthy Alexandrian matrons in the Indian Ocean trade shows their freedom as powerful women to invest in this trade and their willingness to advertise their association with it—that is to say, they appear to be unconcerned about the potential social stigma which could be attached to commercial activities.[80]

Literary Evidence

The most important literary source for our understanding of Mediterranean participation in the Indian Ocean trade is the *Periplus Maris Erythraei* (henceforth *Periplus*). This *koinē* Greek text was written by an unknown author, who describes the routes and sailing times in the Indian Ocean, its major ports, and the goods traded. The author also provides incidental ethnographic and political comments. Casson notes that he must have been a Greek-speaking resident of Egypt, as is clear from personal references such as 'the trees we have in Egypt'.[81] That he writes from personal experience is also made clear from the level of detail provided and the occasional use of the first person in his descriptions.[82] Several studies relating to Nabataean, Indian, and Arabian chronology have demonstrated that the author of the *Periplus* wrote during the mid-first century CE.[83] The *Periplus* itself provides confirmation of its date by referring to King Malichus (of Nabataea) at Petra. This can only be Malichus II (40–70 CE),

2013 seasons—likewise primarily Augustan to late first century CE in date, but largely pertaining to water delivery (c. 70% of the corpus)—see Ast and Bagnall (2016).

79 Cuvigny (2014): 166.

80 *SEG* VIII 703.

81 *Periplus* 29.9.27—trans. by Casson (1989): 7–8.

82 Casson (1989): 8; *Periplus* 20.7.14–15.

83 Cribb (1992): 131–145; Fussman (1997): 66–71; McLaughlin (2010): 8; Seland (2010): 13; Lytle (2016): 118–119, 122.

as Malichus I was too early to be appropriate.[84] In addition, a reference in the text to Manabos, who may be the Western Kshatrapa ruler Nahapana, also suggests a date around 46–65 CE.[85] The dating of the *Periplus* has even contributed to arguments which place Satavahana chronology up to 60 years earlier.[86] The style of the text, personal references, and contextual comments do strongly point to a single author writing around the mid-first century CE (although the author likely drew upon information derived from other merchants), which is the view adopted here.[87]

Why this anonymous author wrote his account is unclear, but given its content, it is generally assumed to have been a merchant's (or shipmaster's) guide to the Indian Ocean.[88] Some have gone further and argued that the *Periplus* formed a maritime manual for navigation and the charting of safe routes.[89] In particular, Marcotte argues that the use of technical terms and the willingness to incorporate many foreign words suggests a readership largely limited to those directly involved in the trade.[90] McLaughlin goes a step further, claiming that it formed part of a collection of trade reports assembled by the governor of Egypt, although there is no real evidence to support this conjecture.[91]

There are some difficulties in seeing this work as purely the accumulated experience of one author. As De Romanis notes, the author tried to be fairly comprehensive in his descriptions of coasts, sea routes, and commodities of the Erythra Thalassa, making it easier to understand this text as an accumulation of information from various sources (not excluding personal observation).[92] It provides valuable details about the period in which it was produced (the mid-first century CE). However, ports rose and declined in prosperity, and the demand for different types of goods changed over time. This was certainly the

84 Casson (1989): 6–7; *Periplus* 19.6.28–29.

85 Turner and Cribb (1996): 318.

86 Cribb (1992): 131–145.

87 A few scholars have recently put forth the theory that the text is a later accumulation of information derived from a number of sources—see Arnaud (2012): 27–61; and Marcotte (2012): 7–25. For a critique of this view see Lytle (2016): 121–122. Seland (2016b): 192, notes the text was probably written by a single author, but relied on information derived from others for certain regions.

88 Casson (1989): 8; Stoneman (1992): 37; Thapar (1997): 14–15; McLaughlin (2010): 7; *contra* Seland (2010): 15.

89 Robin (1997): 42; McLaughlin (2010): 8–9, speculates that several of such documents were circulating and were "vital" to merchants.

90 Marcotte (2016): 176–177; *contra* De Romanis (2016): 106–107.

91 McLaughlin (2014): 111–112.

92 De Romanis (2016): 98–109.

case in the better-documented medieval period, and may be reflected in the fortunes of the southern Indian emporium Muziris, an important site at the time the author of the *Periplus* was writing. Pliny claims, probably a decade or two later, that it was beset by piracy and less suitable than the more southerly Nelkynda (a site connected by Bakare); a Tamil poetic text of the period also alludes to the emporium being sacked by the Pandyan kingdom.[93] Consequently, Marcotte's claim that this text survived for so long because it provided credible information needs to be tempered by the recognition that its main value lay within the period it was written.[94]

There is another *periplus*, entitled *On the Eyrthraean Sea*, written by Agatharchides of Cnidus in the mid to late second century BCE. He was a grammarian and tutor to a son of Ptolemy VII. This allowed him access to the earlier records of travellers sent out by the Ptolemies, and in addition made him a witness of more contemporary developments.[95] Agatharchides had a particular interest in the geographic features of the lands round the Red Sea, as well as an interest in the peoples that inhabited them, but he also makes reference to mercantile activities.[96] The text does not provide the kind of detail found in the *Periplus*, but it is valuable in shedding some light on commercial developments during the Ptolemaic period.

Other texts with geographic, ethnographic, botanical, and zoological interests can also cast light on the trade. This is notably the case with Strabo (63 BCE–24 CE), Pliny the Elder (23–79 CE), and Claudius Ptolemy (second century CE). The information was not always current, as can be seen with Strabo's apology for his reliance on the earlier Hellenistic Indographies of Nearchus, Onesicritus, Cleitarchus, and Aristobulus.[97] Nevertheless, these writers could incorporate contemporary and even first-hand information (or first-hand reports), as Strabo does when discussing his experiences in Egypt and what he has heard about the Eastern Desert, Red Sea, and south-western Arabia.[98] The net can be cast even wider by examining many poetic (e.g. Propertius, c. 50–15 BCE), satirical (e.g. Persius, 34–62 CE), and philosophical (e.g. Seneca the Younger, c. 4 BCE–65 CE) texts. The authors of these works sometimes make incidental

93 For a medieval example see Surat—Chaudhuri (1985): 32–33. For Muziris see De Romanis (1997a): 105–108; *Periplus* 54–56—Pliny *NH* 6.26.105—*Akananuru* 57.14–17, 149.7–13; see also McLaughlin (2010): 49–50.

94 Marcotte (2016): 117.

95 Burstein (1989): 9–10, 17–18, 29–31; Huntingford (1980): 2.

96 Agatharchides 5.105a + b = (a) Photius, Cod. 250.103, 459b; (b) Diod. Sic. 3.47.8–9.

97 Strabo 15.1.3; Dueck (2000): 42, 185.

98 Strabo 2.5.12, 17.1.53, 17.1.45; Dueck (2000): 42, 186.

comments about consumption habits and social values, which are of particular use for understanding the impact of Indian Ocean imports on Roman society.

In addition to Graeco-Roman literature, poetic texts from southern India (part of the Sangam or Cankam anthologies) also provide valuable information. Written in Tamil-Brahmi script, these poems are mostly concerned with themes such as love, heroics, and conflict, but do make occasional allusions to foreign traders and their wares. Works from this corpus are generally placed between the third century BCE and the sixth century CE, and cannot always be dated with much precision. The use of the term Yavana in these works also poses problems, since it is an imprecise ethnic indicator (see Chapter 5).

The wide and diverse nature of the literature under examination necessitates careful analysis of the intentions of these authors (where discernible) and their possible sources of information. A case in point is Philostratus' *Life of Apollonius of Tyana* (*Vita Apollonii*), a text about a Pythagorean philosopher-cum-wizard living in the first century CE who, among his various adventures, travels to India. The debate over whether the text was meant to be understood at the time of its composition (c. 220–230 CE) as biography/hagiography or novelistic fantasy has yet to find any consensus. Of greater interest, given our purpose, are the sources of information Philostratus used when composing this text. Many features of his construction of India derive from earlier accounts: those pre-dating the life of Alexander (e.g. authors like Ctesias), of the period of Alexander (e.g. Nearchus), and possibly the early Hellenistic ambassadorial accounts of India (e.g. Megasthenes). A number of fantastical tales in the *Life of Apollonius of Tyana* draw directly or indirectly from these earlier Indographic texts, for descriptions of the unicorn, for example.[99] Nevertheless, more contemporary information relating to trade may be detectable in the mythological explanation that is given for the building of substantial vessels by the Egyptians who trade with India.[100] This is likely an allusion to the large vessels that were, in fact, operating from the Red Sea ports of Egypt and sailing to various destinations on the littorals of the Indian Ocean.[101] The value of Philostratus' work may therefore rest in what it reveals about the combination of eclectic influences from pre-Hellenistic and Hellenistic literature and contemporary ideas resulting from trade, and the impact this had on Roman perceptions of India in the early third century CE.

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99 Phil. *VA* 3.4.

100 Phil. *VA* 3.35.1–2.

101 Sidebotham (2011a): 195–196; De Romanis (2015b): 133–139. See Chapter 3.

Methodological Approaches

A major difficulty faced in the study of the Indian Ocean trade in antiquity is the lack of statistical data. The types of material that survive in later periods (c. 1500–1900), such as cargo manifests, largely do not survive from the ancient world. Data can be gathered in relation to the types and numbers of finds resulting from particular excavations, but this, as has been noted, presents its own sets of challenges (inconsistencies in approaches, details recorded, and the extent to which particular regions are represented). However, quantitative analysis of evidence within individual sites, especially in relation to chronology, can be regarded as more reliable.

In certain contexts, when data exists and logical deductions can be made from notable constants, such as climatic conditions, a quantitative or statistical approach can also be used to provide a minimum and maximum range of plausible figures. It is argued that this method can be usefully applied to the study of sailing schedules in the Indian Ocean, as well as to logistical issues, such as cargo capacity and the safe stowage of goods (entailing physical principles applicable to all eras). The benefit of this approach is that it does not assert a single rigid figure, but is useful for determining the plausibility and feasibility of particular arguments.

Another area where quantitative and statistical analysis is employed is the assessment of Roman coin finds in India. Some have argued that Roman coins cannot be used as an indicator of the volume of trade, because the process of selecting certain coins means that they came as large shipments rather than as continuous exports.[102] It is, however, argued in Chapter 7 that while certain issues were selected for their recognisable quality, the hoards found in India also reflect the wider availability of particular coins and, to some extent, the minting patterns of particular emperors. The evidence does not, in fact, suggest that coins were exported separately or in a distinct pattern different from the rest of the goods. Consequently, where patterns can be discerned, it is argued that they do reflect fluctuations in the intensity of Roman participation in the trade.

Where appropriate, examination of historical parallels can also shed light on less well-understood periods. However, this must be done with extreme care, and with the acknowledgement that these are only hypotheses and not statements of fact. Rathbone rightly cautions against the dangers of rejecting the ancient evidence when it does not fit into the parallels provided by later

102 Burnett (1998): 185–187; J. Meyer (2007): 60–61.

evidence.[103] A safer approach is to examine historical parallels in the light of certain constants such as basic physical laws that apply to shipping and some climatic factors, like wind patterns.

Summary

To summarise, this study not only aims to incorporate more recent evidence relating to Roman trade in the Indian Ocean, but also seeks to challenge a number of long-running theories, often originating in early twentieth-century scholarship, which continue to reappear (modified or unmodified) in more recent works. An important emphasis is placed on the limits of what the evidence can tell us. Furthermore, some use is made of historical parallels to illuminate various aspects relating to the chronology, logistics, consumption habits, and patterns of Roman trade.

103 Rathbone (2002): 156–157.

CHAPTER 2

The Ptolemies and the Erythra Thalassa

The integration of the Mediterranean world into trade networks in the Red Sea and western Indian Ocean has its antecedents in the Ptolemaic period. The Roman period of activity, ushered in by the annexation of Egypt in 30 BCE, would subsequently build upon these developments. This transition from Ptolemaic to Roman raises a number of questions about the extent of continuity and change. The change of political authority in Egypt was relatively sudden, but there are many reasons to regard the development of Mediterranean participation as one of longer-term processes, and not solely the result of rapid transformation brought about by Augustan annexation.

There is little disputing the fact that during the Roman period the flow of goods between the Mediterranean and Indian Ocean spheres reached a scale not seen previously. This is clear from the comparative volume of written and archaeological evidence. However, many have gone further and argued that it was not just the scale of trade that differed, but the nature of Roman involvement. Advocates of this view argue for differences in terms of the individuals participating, the development of trade networks, and the greater influx of finance.[1] Seland even connects Roman involvement in the Indian Ocean with the notion of an early form of globalisation, or as he terms it, 'oikoumenisation'.[2] Tomber and Sidebotham also suggest that the trade became more systematic, civilian, and commercial than under the Ptolemies.[3] Some have even asserted that the Ptolemaic government held a monopoly on the sale of eastern imports, and that a free market only developed in the Roman period.[4]

1 See for example Warmington (1928): 82; Fraser (1972): 174; Raschke (1975): 244; P. Gupta (1991): 123; Tchernia (1997a) and (1997b); Parry (1999): 213–214; Strauss (2007): 237–238; Gurukkal (2016): 3, 116–117, 124. For a slightly more positive view of Ptolemaic contributions see, Young (2001): 18–20; Boţan (2014): 154; Kobl and Speidel (2015): 119; Lytle (2016): 115.

2 Seland (2008): 70–71; Seland (2010): 2, 18–20; Seland (2014): 386–387; and Smith (2009): 84–85; Kolb and Speidel (2015): 118; Beaujard (2015): 19; H. Ray (2015): 208–209.

3 Tomber (2008): 18, 71; Tomber (2017): 537; Sidebotham (1991): 15; Sidebotham (1996f): 287–288; Sidebotham (2011a): 5.

4 Raschke (1975): 244; Whittaker (2004): 163, 167; McLaughlin (2010): 29, 169; Gurukkal (2016): 20, 139. Conversely Cimino (2014): 54, suggests the opposite, positing an attempted monopoly in the Roman period.

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With the exception of the notion of Ptolemaic court monopolies (which is based on insufficient and doubtful evidence), it is perfectly reasonable to identify changes in terms of financing, participation, and facilitation during the Roman period. However, it is argued here that these developments should be more firmly understood in the context of earlier Ptolemaic precedents. Commercial contact, both direct and indirect, between Egypt, East Africa, the southern Arabian Peninsula and India, saw notable expansion during the late second and first centuries BCE. It is also apparent that many of the routes, waystations, and ports along the Eastern Desert and the Red Sea coast had their origins in the Ptolemaic period. Of course, changes took place, as evinced by construction activity at the ports of Myos Hormos and Berenike. However, this should be seen in the context of already established ports being progressively expanded, as should later construction activity along the Koptos to Myos Hormos and Berenike routes. In many senses, the dividing line between Ptolemaic and Roman is a political one. The trade continued to develop and evolve from the Augustan period onwards, but with many features already established during the time of the Ptolemies.

Early Ptolemaic Activity in the Red Sea

The initial impetus for Ptolemaic activity in the Eastern Desert and the Red Sea was gold mining and the desire for elephants to use in warfare. Scientific curiosity and an interest in exotica also played a part.[5] Much of the gold mining took place in the central Eastern Desert, broadly between the Wadi Hammamat and Barramiya, as can be seen from the remains of walled settlements and forts associated with this activity.[6] To reach these sites routes across the Eastern Desert were established, but these also extended to the Red Sea coast, from which elephant hunting expeditions would be launched. Ptolemy II Philadelphus (285–246 BCE) is reported by Agatharchides as being the first to conduct elephant hunting along the East African coast on a significant scale.[7] The need to reach the hunting grounds led him and his successors to establish a number

5 L. Thompson (1969): 29–30; Fraser (1972): 175; Burstein (1989): 4; Burstein (2008): 147; Desanges (1978): 243–305; Manning (2011): 309–315; Marcotte (2016): 171–172. The elephants captured were potentially not of the Forest (*Loxodonta cyclotis*) type (a subspecies of Savanah type), but the Bush/Savanah type (*Loxodonta africana*)—Schneider (2016a).

6 C. Meyer et al. (2003): 46–53; Sidebotham et al. (2004): 26; Sidebotham, Hense and Nouwens (2008): 213–226; Klemm and Klemm (2013): 12, 68–78, 86–89, 153–156, 193–211, 249–251, 263.

7 Agatharchides 1 = Photius, *Cod.* 250.1, 441b.

of major ports on the Red Sea coast, including Arsinoe, Berenike, Philoteras, and Ptolemais of the Hunt.[8] Another major port, Myos Hormos, was founded by at least the second century BCE, as indicated by both Strabo and Agatharchides, although it is unclear if it was ever connected to elephant hunting activity.[9] Demand for elephants even led to the explorer Simmias (under Ptolemy III, r. 246–222 BCE) setting up hunting bases on the African coast of the Gulf of Aden.[10]

This elephant hunting activity required substantial investments in establishing facilities, organisation, transport, and the payment of hunters. This is apparent from two papyri of 223 BCE alluding to problems of supply and payment, as well as from dramatic literary accounts revealing the dangers faced by those sailing on the specially constructed 'elephant carriers'.[11] These periodic elephant hunting expeditions seem to have ceased by the mid-second century BCE. This is most likely due to the increasing difficulty of accessing live elephants from the coastal regions as a result of overhunting, and the fact that it was no longer necessary to maintain an elephant corps to counter the Indian elephants of the Seleucids.[12]

Despite the Ptolemaic court's declining interest in elephant hunting expeditions, commercial activity continued to grow. As a result, the state wished to ensure it derived tax revenue from this trade. This is evident from an inscription dating to 130 BCE which refers to a Paōs, the *strategos* of Thebes, placing his subordinate Sōterichos in charge of the mining of precious stones in the Eastern Desert, monitoring the shipping, and ensuring the safe transport of aromatics across the desert to Koptos.[13] Besides supervision of these activities, there is also evidence for the Ptolemaic military providing protection. Strabo mentions the existence of guard posts in the Red Sea under Ptolemy VIII (r. 169–164, 145–131, 127–116 BCE), which can be paralleled with Agatharchides' ref-

8 Arsinoe—Strabo 17.1.25; Pliny *NH* 6.33.167; Berenike—Strabo 17.1.45; Pliny *NH* 6.33.167–168; Philoteras—Strabo 16.4.4–5; Ptolemais of the Hunt—Pithom Stele line 23; see Daresse translated by Coult (1956): 19; Casson (1993): 254; Burstein (2008): 142; for possible Pharaonic-era activity at Berenike see Sidebotham (2015a): 14.

9 Agatharchides 83a + b + c = (a) Photius *Cod.* 250.80, 456a = (b) Diod. Sic. 3.39.1–2 = (c) Strabo 16.4.5 (see also 2.5.12).

10 For Simmias see Diod. Sic. 3.18.4. See also Satyrus—Strabo 16.4.5; and Eumedes—Strabo 16.4.7.

11 *PPetrie* II 40(a); *PEleph* 28—see Eide et al. (ed.), (1996): 572–576. For the *elephantēgoi* see, Agatharchides 5.85 a + b = (a) Photius *Cod.* 250.83, 456b–457a = (b) Diod. Sic. 3.40.

12 Cobb (2016): 192–204.

13 *OGIS* 132 = *Pan du désert* 86.

erence to the operation of warships in the Red Sea during the second century BCE.[14] More explicitly, the latter mentions the Ptolemies sending quadriremes to raid Nabataean territory in response to attacks on merchant shipping.[15]

Ptolemaic Trade in East Africa

Despite a strong interest in obtaining elephants for warfare, most Ptolemaic hunting activities were probably directed towards the acquisition of ivory.[16] The influx of this product into Mediterranean markets during the third century BCE is apparent from three temple inscriptions on Delos. These record the prices paid per *mina* (weight) of ivory (in 279 BCE, 8 *drachmae* per *mina*; in 276 BCE, 5 *drachmae* per *mina*; in 250 BCE, 3.5 *drachmae* per *mina*).[17] To what extent other factors influenced these prices remains unknown, but it is not unreasonable to assume that its widespread availability was most significant. According to Agatharchides, live primates were also popular imports. He notes the high demand in Alexandria for varieties of monkeys called *sphinx*, *kunokephalos*, and *kepos*, deriving from the Trogodytic country (broadly the Eastern Desert, extending into Sudan) and from the rest of Aithiopia (roughly northern East Africa).[18] Besides being desired as pets or novelties, some of these animals were used in religious rituals as attested in the sacred animal necropolis of North Saqqara (early second century BCE). From this site 169 mummified primate remains have been uncovered; 146 of them can be identified as *Papio hamadryas anubis* (Olive Baboons), 21 as *Macaca sylvanus* (Barbary macaques), and two as *Cercopithecus* (African green monkeys). The olive baboons came from what is now modern Sudan and Tanzania, most probably via the Red Sea (the majority were males of sub-adult age, suggesting that they were not bred in Egypt).[19] Finds of a baboon and some vervet or grivet monkeys, some wearing iron collars, in an early Roman animal necropolis at Berenike seems to be indicative of a continued interest in importing primates across the Ptolemaic and Roman periods.[20]

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14 Strabo 2.3.4–5; Agatharchides 5.81 = Diod. Sic. 3.38.1–5; also Agatharchides 5.85a + b + c = (a) Photius *Cod.* 250.84, 457a, = (b) Diod. Sic. 3.40.1–9, (c) = Strabo 16.4.7.

15 Agatharchides 5.90a + b = (a) Diod. Sic. 3.43.1–5, = (b) Strabo 16.4.18.

16 Burstein (1996): 799–807.

17 Tarn (1938): 366; Rathbone (2000): 48; Sidebotham, Hense, and Nouwens (2008): 162–164; McLaughlin (2010): 24 n. 8; Reger (2002): 138—IG XI 2163Aa7 (279 BCE); 203A71 (276 BCE); 287A118 (250 BCE).

18 Agatharchides 5.73–74 = Photius *Cod.* 250.72–73, 455b; Strabo 16.4.16; Diod. Sic. 3.35.5.

19 Goudsmit and Brandon-Jones (2000): 111–118.

20 Sidebotham and Zych (2016): 24; Zych et al. (2016): 328; Sidebotham (2017b): 63.

The demand for aromatics was also a major spur for commercial activity. A loan agreement on a papyrus of 150 BCE reveals a group of individuals originating from Egypt, Massalia, Carthage, Lacedaemonia, Thessalonike, and Elea (in Italy) who were involved, either as merchants, lenders or guarantors, in a trade venture to the Spice-Bearing (Ἀρωματόφορος) land.[21] The precise location of this place is unknown, but it has most convincingly been connected to Somalia since the author of the *Periplus* places the Spice Port in this region and Strabo calls the promontory around Cape Guardafui the 'frankincense-bearing lands'.[22] Those involved in creating the contract clearly had a sense of the sailing schedules and timings. After the ship's return to one of the Red Sea ports an allowance of 50 to 90 days was permitted to get the goods across the Eastern Desert and up the Nile to Alexandria.[23]

Long-term contact between Greek-speaking merchants and communities in East Africa during the Ptolemaic and Roman periods was evidently sufficient to make some cultural impact. The author of the *Periplus* reports that Zoskales of the Barbaroi (possibly the ruler of Axum) was able to converse in Greek and had some knowledge of Greek literature.[24] Pliny could mistakenly believe that the site of Adulis (on the Gulf of Zula) was founded by Egyptian runaway slaves, while Cosmas records a Greek stele inscription set up at this site by Ptolemy III.[25] The degree of Hellenic influence on the wider population cannot be known, but it appears that the Axumites initially chose Greek letters and legends when they started minting coins around 270 CE.[26]

There are archaeological traces of contact with East Africa from the Ptolemaic period. The site of Hafun West has revealed a Ptolemaic lamp fragment, some sherds of late Hellenistic *lagynoi*, and sherds of amphorae with fabric typical of the Nile Valley (produced from the first century BCE to the fourth century CE), alongside later Roman material. The site seems mostly to have been occu-

21 *SB* III 7169—see Wilcken (1925): 86–102; Fraser (1972): 275 n. 216 (volume II); Raschke (1978): 662; Young (2001): 54–55; Whittaker (2004): 163; Adams (2007): 233; Sidebotham (2011a): 34; Evers (2016): 121–122.

22 *Periplus* 12 (Ἀρωμάτων ἐμπόριον); Strabo 16.4.14; Casson (1989): 129.

23 De Romanis (2014): 76–77. If repayment was late an annual rate of 8% extra could be added to the loan.

24 *Periplus* 5. Coult (1956): 27–28; Casson (1989): 109–110; Peacock and Blue (2007); Bowersock (2013).

25 Pliny *NH* 6.32.145; Cosmas *Christian Topography* 2.58. For the practice of Axumite kings using Greek on commemorative inscriptions see Bowersock (2013): 14–19, 32.

26 Seland (2008): 72.

pied in the first century BCE, and the finds indicate continuity of contact with East Africa from the Ptolemaic to the Roman period.[27]

Ptolemaic Trade with Arabia

Knowledge of the Gulf of Aden region was not just limited to the East African coast. During the reign of Ptolemy III (246–221 BCE) Ariston was sent to reconnoitre the coast of Arabia (possibly the Ariston mentioned in the Zenon Papyri), perhaps going beyond the Bab-el-Mandeb.[28] By the second and first centuries BCE merchants were coming to the coast of southern Arabia, as indicated by Agatharchides, Strabo, and the author of the *Periplus*.[29] A graffito from the Paneion (el-Kanais) on the route between Edfu and Berenike mentions the thanks of Zenodotos to the god Pan for successfully accomplishing his return from the land of the Sabaeans (Yemen), while another individual gives thanks for avoiding disaster in the Red Sea when returning from the sacred land which produces myrrh.[30] The port of Qana' (Kane of the *Periplus*), in the Kingdom of Hadramawt, has revealed Coan amphorae among other types of Mediterranean pottery. Some of these Coan fragments may have belonged to vessels which date as early as the mid-first century BCE, opening up the possibility of Ptolemaic-era trade links.[31]

In the Hadramawti ports of Qana' and Sumhuram (probably the Moscha Limen of the *Periplus*, modern Khor Rori), imitation Athenian *tetradrachmae* (head/owl series) have been found. Some of these include Greek legends dating from the mid-fourth to early second centuries BCE, which probably also suggests familiarity with genuine issues.[32] A bronze Ptolemaic coin (c. late second to early first century BCE) has been found in the vicinity of Shabwa, and another from Tumna.[33] The finds of Mediterranean ribbed-glass bowls dating from the last half of the first century BCE to the first half of the first century CE may be indicative of continuing trade contacts from the Ptolemaic to the Roman period.[34] In addition, bronze work of Hellenistic design has been found

27 Smith and Wright (1988): 120, 124 (material at Hafun West); Horton (1996): 449–450.

28 Agatharchides 85b = Diod. Sic. 3.41.1–4; Marcotte (2016): 172—*PP* 16902.

29 See Agatharchides on Arabia in Book 5; *Periplus* 26.

30 A. Bernand (1972): nos. 2, 8.

31 Sedov (2007): 76–78; Sedov (2010b): 372; Sedov and Salles (2010): 460. More sceptically Sedov (1992): 127; Cuvigny (2010a): 424.

32 Sedov (2008): 277–278; Sedov (2010b): 373; Sedov and Salles (2010): 456. Ptolemy *Geog.* 1.9 mentions the spice promontory.

33 Sedov and Salles (2010): 458.

34 Lombardi, Buffa, and Pavan (2008): 402.

in sites in this region, including a bust of Athena found at Jabal al-Lawdh dating to the third-second centuries BCE.[35]

This contact was not one-way, as seen from several Arabian incense merchants who left graffiti and inscriptions in Egypt.[36] These records have been found in the Wadi Hammamat (along the Koptos-Myos Hormos route—ὁδὸς Μυσορμιτική) and at Myos Hormos, although many give little detail beyond names and tribal affiliations.[37] Given the locations of these graffiti, it is reasonable to assume that they were traders.[38] The sarcophagus of a Minaean trader called Zaydʿil bin Zayd found at Memphis bears an inscription describing himself as an importer of myrrh and calamus for the temples of Egypt. The date given on the inscription is the twenty-second year of Ptolemy, son of Ptolemy, placing it anywhere between the mid-third and mid-first centuries BCE.[39] The prominence of the Minaean Arabs in the incense trade is also seen from the designation 'Minaean frankincense' recorded in one of the Zenon Papyri.[40] Nevertheless, they were not the only Arabian peoples involved in trading aromatics. Agatharchides mentions that Sabaean merchants traded an aromatic substance called *larimnum*.[41]

In some instances, Arab traders travelled beyond Ptolemaic Egypt into the Mediterranean, as revealed by a Minaean inscription on an altar from Delos dated to the second century BCE.[42] The reason why this Minaean merchant travelled to Delos is not clear—perhaps for better profits, although there is no evidence to confirm this. Other temple inscriptions from Delos offer evidence that frankincense prices fluctuated over time (as seen with the price for ivory), probably as a result of increasing supplies, even if it may not have been the only factor involved.[43] The evidence suggests that by the third and second centuries BCE commercial contact between Egypt and southern Arabia was significant, and had a wider impact on the Eastern Mediterranean.

35 Glanzman (2002): 132–134.
36 Hoyland (2002): 69–70.
37 Sidebotham (1986): 99; *RES* 2771.
38 Sidebotham (1986): 20; Sidebotham (1989): 497; Young (2001): 62.
39 Hoyland (2002): 69–70—M 338; Ptolemy II, III, V, VIII, XII, are all potential candidates.
40 *P. Cair. Zen* 59536.
41 Agatharchides 5.103a + b = (a) Photius, Cod. 250.101, 459a = (b) Strabo 16.4.19—On inscriptions from Saba see Robin (2002): 51–53.
42 M 349; Groom (2002): 91; Hoyland (2002): 70.
43 On other factors see Reger (2002): 139–140.

Early Ptolemaic Trade with India

By the early to mid-Hellenistic period, some purportedly "Indian" products (animate and inanimate) appear to reach Egypt. This should hardly be surprising, since by the late fourth century BCE Theophrastus was already familiar with a range of fragrant plants used in aromatics that had ended up in the Eastern Mediterranean world.[44] These products may have reached Egypt by changing hands many times, but it is clear that from the late second century BCE intermediary sites were being frequented by merchants sailing from Egypt and India. Agatharchides reports that the Fortunate Islands provided a meeting place for merchants from Patala (the Indus River), Persia, Carmania (southern Iran), and by implication Egypt.[45] This very likely refers to the island of Socotra (known most often in Graeco-Roman sources as Dioscorides), to which Cosmas believed that the Ptolemies had sent Greek settlers, and which still possessed a trade settlement in his own time (sixth century CE).[46]

Late medieval Arabic accounts and versions of the *Alexander Romance* have led some modern scholars to consider the possibility that Alexander or the Ptolemies sent settlers to Socotra, although scepticism remains.[47] Archaeological and written evidence prior to the first millennium CE is limited, but from the first to fifth centuries CE, individuals from the Mediterranean or the Near Eastern world were certainly resident (continuously or intermittently) on this island. This is indicated by two Greek memorial graffiti from the Hoq Cave, set up by a Septi(mios) Paniscos, a shipowner (*naukleros*), and an Alexandros.[48]

44 Theophr. *Enquiry into Plants* 9.7.2.

45 Agatharchides 5.105a + b = (a) Photius, Cod. 250.103, 459b = (b) Diod. Sic. 3.47.8–9. Indian inscriptions from the Hoq cave on Socotra show a strong connections with western India—Strauch (2012): 321, 341–342.

46 Cosmas *Christian Topography* 3.178–179; Bukharin (2012b): 509–510. The notion that the term Fortunate Islands derives from the Sanskrit *Sukhatara dvipa*, 'the most pleasant island', has recently been challenged—Müller (2001). See also Robin (2012b): 443–445.

47 Otto and Bengtson (1938); Raschke (1978): 645; 658. For a more sceptical view see Biedermann (2010): 10. More generally on this issue see Desanges (1978): 302; Bukharin (2012b): 503–505; Strauch (2012): 384–386; Marcotte (2016): 172.

48 Bukharin (2012a): 494–500. The author of the *Periplus* (30–31) also mentions settlers on Dioscorides, including Arabs, Indians, and some Greeks. By the mid-first century CE it was given over to a consortium of Arabs. Whether this prevented other traders from using the island is unclear (for the view that this was not the case see Evers (2016): 192–193), but if Cosmas' is to be believed, Greek "colonists" either returned or were never expelled. It is possible that by this point Axumite influence had increased at the expense of Arabian—Robin (2012a): 439–441.

Near the site of Hadiboh, some Mediterranean ceramics have been identified along with those from southern Arabia, the Persian Gulf and possibly India; an assemblage that shows parallels with finds from Qana'.[49] The island may have been suitable as an entrepôt but it was not suitable as an intermediary stage for Mediterranean merchants wishing to sail on to India. This is because it would have been difficult to land on the north coast of Socotra around June to August, at the height of the Southwest Monsoon.[50]

Another meeting point for merchants travelling from Egypt and India was the port of Aden (Eudaimon Arabia) in the kingdom of Himyar. The author of the *Periplus* states that:

> Eudaimon Arabia, previously a city (*polis*), was called Eudaimon ('fortunate') at that time, for those from India were not yet coming to Egypt, nor did those from Egypt have the courage to travel to places further but only came this far, it used to accept cargoes from both …[51]

The author unfortunately does not provide an explicit date for this activity, although it must obviously predate the mid-first century CE. He does, however, state that Aden was a prosperous port prior to its sack by Caesar (*Kaīsar*). This statement is rather controversial. Various alternative explanations have been proffered, including a reference to its sack by Aelius Gallus, Gaius Caesar (grandson of Augustus), or a mistaken emendation of the name Charibael (an Arabian king mentioned elsewhere by the author).[52] Seland seems to offer the most plausible explanation in suggesting that the author conflated Augustus' attack (through his deputy Aelius Gallus) on Eudaimon Arabia (southern Arabia) with an actual sack of the port known as Eudaimon Arabia (i.e. Aden).[53] This interpretation is preferable to the others, since it is explicitly stated by Strabo that Aelius Gallus did not advance beyond Ma'rib, while there is no evidence for Gaius Caesar campaigning in southern Arabia.[54] Since Aelius Gallus'

49 Biedermann (2010): 11; Seland (2010): 44; Seland (2014): 377–378; Strauch (2012): 379.

50 On these difficulties see Strauch (2012): 381; Evers (2016): 178–179.

51 *Periplus* 26—own translation.

52 Gurukkal (2016): 124; Villeneuve (2007): 13 (Gaius Caesar)—*CIL* XL 1421; Miller (1969): 14; McLaughlin (2010): 3, 71; Malekandathil (2015): 344–345 (Aelius Gallus); Schoff (1912): 32, 115–116 (manuscript corruption for Charibael, Elisor or Eleazus); Cimino (2014): 55 (speculates that Aden was torn down as part of a Roman-Himyar agreement).

53 Seland (2010): 21–22.

54 Sidebotham (1986): 130–131—Pliny *NH* 6.31.141.

expedition occurred in 26–25 BCE, Seland's interpretation would imply that the author of the *Periplus* is emphasising Aden's significance prior to the Roman period, although this is conjecture.

However one chooses to interpret this comment in the *Periplus* there is nevertheless other evidence to suggest that southern Arabian ports acted as important meeting points. Indian Red and Black Wares have been found at Khor Rori in the first phase of occupation (third-first centuries BCE), suggesting that either goods, merchants or both frequented the site. Likewise, the aforementioned presence of Coan vessels and imitations of Athenian tetradrachms might also suggest that merchants from the Mediterranean world were visiting these sites.[55]

To come back to the references to Indian goods in Egypt during the early-mid Ptolemaic period, Callixeinus of Rhodes claimed to have seen Indian dogs, cattle and women in a procession in Alexandria (second century BCE), and elsewhere he mentions pillars of Indian gems.[56] Likewise, there is a reference in the Zenon Papyri (third century BCE) to an Indian dog named Tauron.[57] Another one of these papyri even records the products *murou kinnamōmou* (cinnamon) and cassia. If these can, in fact, be identified with their modern namesakes, they may ultimately have derived from China or Sri Lanka, albeit transhipped via India and Arabia.[58] The fact that Seleucus I (288/287 BCE) could grant the temple of Apollo at Didyma a range of goods, including frankincense from Arabia, cinnamon, and *costus speciosus* (most likely acquired via the Persian Gulf), demonstrates that such commodities could reach the Mediterranean world.[59]

The sources variously attribute the origins of cinnamon to Ethiopia, Arabia, and India, leading some to identify it with a different plant to its modern name-

55 Avanzini (2007): 25–27; Avanzini (2008): 612. On early Ptolemaic interests in connections with India see Fraser (1972): 180–184; Manning (2011): 314. On the existence of this port as far back as the fourth century BCE see Davidde (2017): 585–586.

56 Fraser (1972): 180—*FGrH* 627 F 2, § 32 (Athen. 200 F); (F 1 (39); Athen. 205 E).

57 *P. Cair. Zen* IV 59532; Fraser (1972): 180 n. 386; Raschke (1975): 241, suggests it was a locally bred dog but of an Indian species.

58 Reger (2005): 275—*P. Cair. Zen.* I 59009d 10–13 (*murou kinnamômou*); *P. Cair. Zen.* IV 59536 10–20 (cassia); see also *P.Hib* II.271. Young (2001): 20, is sceptical that this is the same product.

59 Salles (1987): 90. In fact, from as far back as the early Iron Age (eleventh to tenth centuries BCE) it is clear from residue analysis of Phoenician clay flasks found in Israel that cinnamon (either from South, East or Southeast Asia) was reaching the Eastern Mediterranean—Gilboa and Namdar (2015): 266–270.

sake.[60] However, it seems more logical to interpret this as a reflection of the availability of the product in the emporia of these lands. Similar questions are raised by an inscription from the Paneion at el-Kanais, which records Apollon offering up Indian myrrh for the safe return of his father (the latter's location is not specified).[61] Since true myrrh does not grow in India this attribution might indicate either a degree of confusion on Apollon's part or the use of the term myrrh to denote a different plant product that may actually have been of Indian origin (see below). Either way, this reference suggests that "Indian" goods (whether ultimately derived from there or not) were perceived by contemporaries to be reaching Egypt.

Those who see the "Indian" origin of these goods as more a matter of perception than reality might point to the conflation in some classical literature regarding India and Ethiopia. By the time Cosmas is writing (sixth century CE), the term India could refer to Ethiopia, southern Arabia, India proper, Sri Lanka, and even regions further east.[62] Sometimes distinguishing epithets like 'Inner India' (used by Cosmas) or 'India Major' are employed to refer to India proper, while 'India Minor' may allude to East Africa (as seen in the fourth-century *Expositio mundi et gentium*), although the terminology is not always so clearly used.[63] This obviously creates a challenge when identifying products labelled as Indian.

Nevertheless, despite these potential conflations, the possibility of an Indian (or Far Eastern) origin for some of these items need not be completely ruled out. With regard to Apollon's inscription, it is notable that in the first century CE Pliny referred to both Trogodytic (possibly *Commiphora spp*) and Indian (possibly *Balsamodendron spp*) "myrrh".[64] This would seem to suggest an awareness of two separate products, even if some doubt has been expressed about the ability to make a detailed distinction when only observing the products rather than the plants themselves.[65] The fact that Ashoka the Mauryan emperor (r. 269/268 to 233/232 BCE) was familiar with the political situation in the Eastern Mediterranean world around the mid-third century—showing knowledge of the kingdoms controlled by Antiochus (Soter), Ptolemy (Philadelphus),

60 Ethiopia—Strabo 2.1.13; Arabia—Hdt. 3.107; India—Theophr. *History of Plants* 4.4.14; Schneider (2016b): 184. On this debate see Chapter 6.

61 A. Bernand (1972): no. 72; Sidebotham (1986): 2; McLaughlin (2010): 26; Mairs (2011): 161.

62 Mayerson (1993): 169–174; Schneider (2016b): 186, 191, argues these ideas originate much earlier.

63 Mayerson (1993): 170.

64 Pliny *NH* 12.30.51, 36.71.

65 Schneider (2016b): 193–194.

Antigonus (Gontas), Megas (of Cyrene), and Alexander (of Epirus)—also reminds us that South Asian and Eastern Mediterranean links existed in the mid-third century BCE.[66]

Whatever one's view of the ultimate origin of the aforementioned items, it is clear that objects from the Mediterranean world did reach India during the Hellenistic period (either directly or indirectly). Ptolemaic bronze coins have been discovered in western India, while small Hellenistic bronzes originating from Asia Minor have been found at Karur and Madura. Even a silver coin struck in Cyzicus in Mysia has been found.[67] Similarly, it has recently been claimed that a gold coin of Ptolemy II (r. 285–246) was recovered from the deep harbour of Vizhinjam (possibly the Balita of the *Periplus*) in southern Kerala.[68] Lead from Western Mediterranean mines was probably used in coins found in the central Deccan before the coming of the Satavahana dynasty (founded around late third to first centuries BCE), as suggested by isotope analysis.[69] Presumably, in order to mint these coins consistently, there must have been trade networks. Other finds include Megarian bowls and their imitations in the Deccan, which possibly date to the Hellenistic period.[70] Strong stylistic and typological links between Egyptian Hellenistic era terracottas objects and terracottas made in the Deccan may also be seen as evidence of (in)direct contact.[71] This material is certainly limited compared to later Roman-era finds, but it nevertheless reveals that, either by direct or indirect means, a few items were reaching India in the early to mid-Ptolemaic period.

Voyages over the Open Ocean: The Monsoon Trade Winds

By the late second to early first centuries BCE, an increasing number of Mediterranean merchants were willing to undertake voyages between Egypt and India, rather than just stop at southern Arabian or East African entrepôts. While it is possible (if unlikely) that some of this initial activity focused on lengthy coastal voyages along the littorals of Carmania and Gedrosia, an examination of the

66 Thirteenth Major Rock Edict—for translation see Thapar (2012).

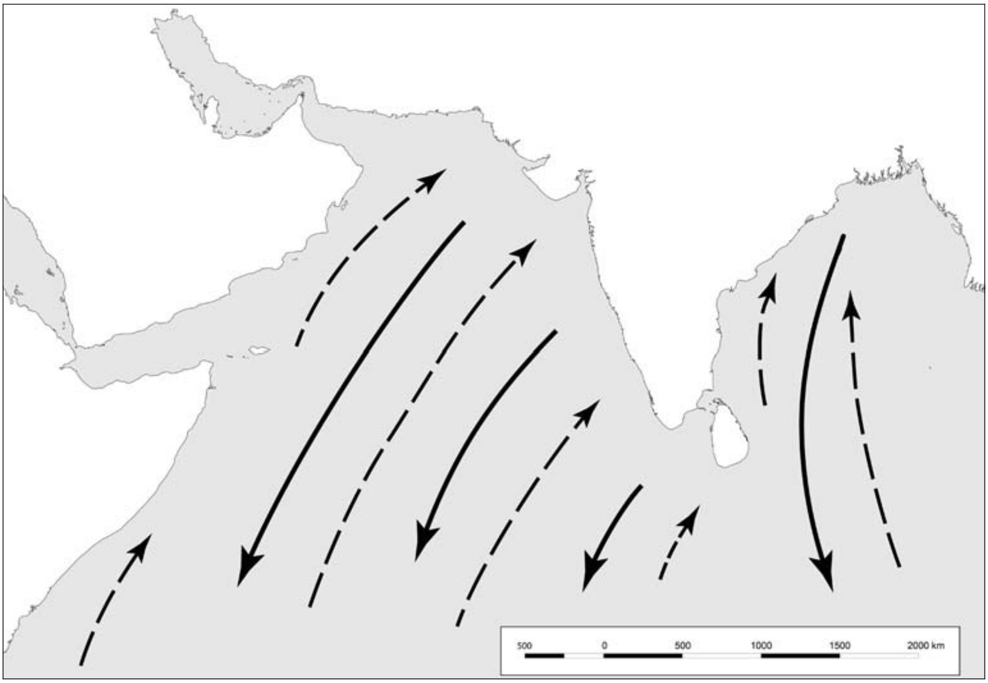
67 Berghaus (1991): 108; Tchernia (1995a): 155.

68 Kumar et al. (2013): 197. On a possible image of a Ptolemaic king on one side of a gold disc from a Roman coin hoard at Karivalamvandanallur see Suresh (1992): 55.

69 Seeley and Turner (1984): 331–333; Ray (1994): 78; Tchernia (1997b): 261; Tchernia (2016): 237.

70 P. Gupta (1991): 123; Brancaccio (2005): 63–64.

71 Brancaccio (2005): 56–58.



MAP 2 *The Southwest and Northeast monsoon winds*

"discovery traditions" reported in our classical sources suggests that more and more direct oceanic voyages were taking place.[72] Merchants setting out from the Red Sea ports of Egypt would sail down the Red Sea, and after entering the Gulf of Aden, utilise the latter stages of the Southwest Monsoon (running between July and September) to reach India; then, around December to January, they would use the Northeast Monsoon to make a return voyage. There are some scholars who argue that it was not until the Roman period that full utilisation of the monsoon winds by Mediterranean merchants took place and that, as a result, there was next to no direct trade between Egypt and India in the Ptolemaic period.[73] However, as will be demonstrated, this notion rests on an unsustainable set of assumptions.

The classical authors report two distinct literary traditions about the first individuals to "discover" the routes over open water to India. The first tradition comes from an account that Posidonius heard when he was at Gades around

72 Even in the earliest stage of voyaging to India mentioned by Pliny, he refers to the use of the westerly 'Hipplaus' wind (*NH* 6.26.100).

73 See for example, Schoff (1912): 3, 5–6; Warmington (1928): 38; Miller (1969): 16; Salles (1996b): 264. See Map 2.

the late-second century BCE, and survives thanks to a dismissive retelling by Strabo. In this version, Eudoxus of Cyzicus is credited as being the first Greek to make a voyage to India. It so happened that he had joined the court circle of Ptolemy VIII near the latter part of his reign. This coincided with the discovery by the Ptolemaic coastal guard of a shipwrecked Indian sailor who had ended up in the Red Sea. The Indian was brought to the royal court, and, after being taught Greek, promised to guide an expedition to India with Eudoxus as its leader. The journey was a success and Eudoxus returned with a full cargo of perfumes and precious stones, which was taken possession of by Ptolemy VIII. A subsequent expedition was sent by Cleopatra III, but, likewise, the return cargo was seized by her son. The story continues with Eudoxus being inspired to find a route to India by rounding Africa from the west. Strabo follows this with an attempt to pick apart the details of Posidonius' account and admonishes him for propagating the "story".[74] A *terminus ante quem* of 116 BCE has been offered for this first voyage as this was the year Ptolemy VIII died, and the second voyage initiated by Cleopatra III must have returned by 107 BCE, when Ptolemy IX Soter II was in power.[75]

The other tradition is recorded by Pliny and the author of the *Periplus*, who both refer to a man called Hippalos.[76] The latter states that the wind (the Southwest Monsoon) which enabled merchants to sail over the open sea was named after this man:

> The helmsman Hippalos, having observed the position of the emporia and the characteristics of the sea, was the first to voyage over open sea …

Mazzarino argued that Pliny did not believe in a man called Hippalus (the Latin rendering of the Greek Hippalos). He suggests that when Pliny mentioned a wind called Hippalus in section 6.26.104 of the *Natural History*, he was uncritically transcribing information from his contemporary sources—namely, the merchants from whom his description of the sailing routes to India ultimately derived. He also suggests that the other reference to a wind called Hippalus (in section 6.26.100) is the result of mistaken emendations by modern editors, whereas Pliny, in fact, mentions a *hypalum* (an under-sea wind). Thus, the latter case can be attributed to transmission errors, while the former represents

74 Strabo 2.3.4–5.

75 Habicht (2013): 199; see also Sidebotham (2011a): 17.

76 *Periplus* 57; Pliny *NH* 6.26.100, 104–105. Ptolemy also mentions a Hippodos or Hippalon sea which joins the Indian Ocean—Hatcher (2013): 24.

an origin myth that merchants had created from a conflation of the name Hippalus with the notion of a *hypalum*.[77] Mazzarino's argument about the textual transmission affecting the reading of section 6.26.100 may have some validity, but ultimately it is not possible to know whether Pliny believed in the existence of a mythical/historical Hippalos, since he only reports the name and does not offer any positive or negative affirmation. What is clear is that both Pliny and the author of the *Periplus* do not mention Eudoxus, either due to ignorance, disbelief, or lack of interest.

In any case, neither Eudoxus nor Hippalos, if they existed, were the first Greeks to encounter the monsoon winds. Scylax of Caryanda is reported to have undertaken a coastal journey from the Indus to the Suez (c. 510s BCE) at the direction of King Darius of Persia.[78] His account does not survive, and even in antiquity he seems to have been more known than known about. Consequently, it is difficult to be sure if he ever mentioned the monsoon winds.[79] What is clear is that the tail end of the Southwest Monsoon and the beginning of the Northeast Monsoon were encountered at the time of Alexander's march across the Gedrosian desert, since Nearchus' fleet was unable to depart from the mouth of the Indus until the latter had gotten underway.[80] It is difficult to know how widely this knowledge was disseminated or the extent to which this annual phenomenon was understood by Greeks at the time.

There are certainly a number of scholars who believe that during the Hellenistic period there was little understanding of how to utilise the monsoon winds, and that Arab merchants deliberately held back knowledge of them to disadvantage their Western "competitors".[81] However, the idea that some collective conspiracy could be so easily orchestrated stretches credulity, and it

77 Mazzarino (1997): 72–79. Also Tchernia (1995b): 992–994; Tchernia (1997b): 250–260; Tchernia (2016): 229–233; Hatcher (2013): 19–29. *Contra* Habicht (2013): 202, who asserts that Hippalos was a reasonably common name in Egypt.

78 Hdt. 4.44; Parker (2008): 14–18, on credence given to Scylax's journey; also Romm (1992): 84–85; *contra* Salles (1996b): 254.

79 Parker (2008): 16.

80 Tchernia (1995b): 991, 995–996; Tchernia (1997b): 256; Tchernia (2016): 232; Hourani (1995): 25. Arrian states (*Ind.* 21.1) that that Nearchus' fleet had to wait until the summer trade winds had subsided (setting out on the 20th of Boedromion, i.e. during October). In the *Anabasis* (6.21.1–3), he claims Nearchus waited till winter (the setting of the Pleiades, i.e. November); the latter in accord with what is reported by Strabo (15.1.17).

81 See Schoff (1912): 3, 5–6; Rougé (1988): 68–69; Singh (1988): 21; Salles (1996b): 264; Ball (2000): 132; Sidebotham (2011a): 38; and Marcotte (2016): 172–173. *Contra* Hourani (1995): 25. Raschke (1978): 662, argues that the Ptolemies were aware of the monsoon winds, but economic conditions limited trade.

makes even less sense when considering the different schedules adhered to by Arabian merchants. Hourani notes that the Arab sailing tradition did not usually employ the Southwest Monsoon to reach India, though knowledge of the pre-Islamic period is limited. Instead, Arab merchants sailed along the coast of the Arabian peninsula to its northeastern tip during the winter season, and then sailed southwest (by tacking) with the gentler Northeast Monsoon and smoother seas to reach the southern tip of India. The return journey was undertaken with the same Northeast Monsoon to make a straight run to Aden.[82] This is in contrast to merchants travelling from Egypt in the Ptolemaic and Roman periods who would have made use of the Southwest Monsoon winds to sail eastward. It should also be pointed out that there is no reason to assume that increased direct oceanic voyaging on the part of Mediterranean merchants had a negative impact on Arabian ports as is apparent from the continued prosperity of many important entrepôts in the Roman period.[83]

Many scholars give credence to one or both of the discovery traditions.[84] Some even go so far as to combine the two, proposing that Hippalos accompanied Eudoxus on his first expedition to India before subsequently taking up the mantle of further Indian Ocean voyages. This idea has been promoted despite the fact that Strabo makes no mention of Hippalos.[85] Just as problematic are attempts to date the period in which Hippalos supposedly operated. Suggestions range from the second century BCE down to the reign of Domitian (81–96 CE).[86] A first century CE date is particularly advocated by those who wish to argue that Ptolemaic-era trade was limited due to a lack of direct oceanic voyages. Warmington has been the most notable proponent of this view, arguing that Hippalos was probably alive in the reign of Tiberius. He suggested

82 Hourani (1995): 26–28; Curtin (1984): 99. Also Casson (1989): 284–291; and Fauconnier (2012): 84.

83 Peacock and Williams (2007); Avanzini (2008a); Salles and Sedov (2010).

84 See for example Strauss (2007): 242; Bernstein (2008): 38; McLaughlin (2010): 25; Sidebotham (2011a): 15; Habicht (2013).

85 Mooren (1972): 133; Kearney (2004): 42. Also Dalby (2000a): 43, does not mention Eudoxus but places "Hippalos" before 100 BCE.

86 Lindsay (1874): 104 (reign of Claudius); Warmington (1928): 44–49 (reign of Claudius); Charlesworth (1928): 92–100 (c. 20–10 BCE); Thorley (1969): 212 (end of first century BCE); H. Ray (1994): 67 (first century CE); Phillips (1997): 448 (not directly tied to Hippalos, but monsoon discovery dated to late second century BCE); Parry (1999): 217 (50 BCE); McLaughlin (2014): 150 (first century CE); Kolb and Speidel (2015): 118–119 (second century BCE); Malekandathil (2015): 345; Gurukkal (2016): 101, 110, 114, 123 (no cross-oceanic voyages until Roman period).

that Hippalos' activities should be seen as the precursor to the full discovery of the monsoon winds by the freedmen of Annius Plocamus during the reign of Claudius, the freedmen having accidentally arrived in Sri Lanka after being caught up in an unexpectedly ferocious wind while sailing around southern Arabia.[87] The problem with this notion is that it is based on the unsubstantiated idea that the sudden gale that caught the freedmen off-guard connects to the monsoon winds. This is in no way suggested by Pliny.[88]

Ultimately, any attempt to try and date when Hippalos lived, assuming such a person ever existed, is a dubious prospect, since neither Pliny nor the author of the *Periplus* give any precise details about this man. The only thing that can be asserted with confidence is that the tradition about the man (whether he existed or not) must have developed prior to the mid-first century CE (the most probable date for the *Periplus*). It cannot even be definitively stated whether or not the tradition about Hippalos predates the one connected to Eudoxus (late second century BCE).[89]

The question that remains is, how should these two discovery traditions be understood? Given the possibility that the Greeks had some idea about the monsoon winds at least from the time of Nearchus, and that there is no credible reason for believing in an Arabian merchant conspiracy, it need not be assumed that either tradition is primarily concerned with the "discovery" of the monsoon winds. Tchernia is undoubtedly correct in pointing out that the development of direct voyages to India should be connected with longer-term processes and not based solely on specific events. It is very likely that the increasing use of the monsoon winds was the result of growing confidence that by sailing over open water sailors would reach the Indian coast. As Tchernia notes, these merchants came to recognise that many of the ideas of the ancient geographers (as exemplified by the *Geography* of Ptolemy) were incorrect, and that the Indian landmass stretched southwards and not eastwards as had been supposed.[90] The latter view was partially based on the classical mapping tradition which focused on itineraries and the space between points in linear succession.[91] Indeed, the importance of being confident about reaching landfall when sailing over the open ocean can be seen in the persistent anxi-

87 Warmington (1928): 43–51. A dating occasionally followed in more recent scholarship—see, for example Cappers (1999): 186.

88 Pliny *NH* 6.24.84.

89 Habicht (2013): 202.

90 Tchernia (1995b): 996–998; Tchernia (1997b): 257–258. Also Tarn (1938): 369–370; Whittaker (2004): 154–155.

91 Whittaker (2004): 64–65, 77.

eties of sailors. Even as late as the sixth century CE, Cosmas reports how sailors on a journey to Sri Lanka were nervous lest they get blown off course into the 'great ocean'.[92]

The importance of understanding the development of cross-oceanic voyaging in the Indian Ocean in the context of long-term processes does not mean that the traditions connected to Eudoxus and Hippalos need to be dismissed or disregarded. In the case of Eudoxus, there is no real reason to doubt his existence, nor, despite the scepticism of Strabo, for rejecting all the details about his travels.[93] It is perfectly possible to place his first two voyages in the context of developing knowledge about the locations of ports and confidence about making safe landfall. Later stories about Hippalos (whether a genuine man or an aetiological myth) also served the purpose of helping sailors comprehend these long-term developments. It seems unjustified to assume that the tradition connected to Hippalos implies that cross-oceanic voyages did not begin until the Roman period. In fact, the report that Eudoxus got blown off course to East Africa on his second return voyage is indicative of cross-oceanic voyaging and not mere coasting.[94] Indeed, coasting along the inhospitable Gedrosian littoral (coastal Baluchistan) is unlikely to have ever been a regular practice.[95] It is abundantly clear that by the late Ptolemaic period some Mediterranean merchants were sailing to India.

Increasing Trade

The rapidity with which cross-oceanic voyaging developed from the late second century BCE to the end of the Ptolemaic period cannot be mapped with any precision. However, the appearance around this period of offices concerned with the oversight of private mercantile activity in the Indian Ocean does suggest it had become substantial enough to interest the authorities. The role that Sōterichos played in overseeing the mines, shipping, and security of the aromatics trade (130 BCE) has already been alluded to, but this office (subordinated to the *strategos* of Thebes) appears to have been replaced by the role of overseer of the Erythraean and Indian Seas. When the latter office first appeared is subject to some controversy, with one fragmentary inscription potentially indicating a date anywhere between the late second to mid-first centuries BCE (116,

92 Cosmas *Christian Topography* 2.133.

93 Strabo 2.3.4–5; Habicht (2013): 198.

94 Strabo 2.3.4.

95 Tchernia (2016): 229.

110/109, 74/73 and 45/44 BCE). The surviving wording of the inscription makes it possible that it was set up either in the eighth year of the reigns of Cleopatra III and Ptolemy IX Soter II, Ptolemy XII Auletes or Cleopatra VII.[96] Sidebotham notes a possible link to the voyages of Eudoxus of Cyzicus and prefers a second century date, while Mooren believes it to date to 74/73 BCE, on the basis of the aulic titles held by the two brothers who dedicated the inscription. Whatever the case may be, a powerful individual known as Kallimachos is mentioned in a number of inscriptions connected to the supervision of the Thebaid, the Eastern Desert, and the Red Sea, including the holding of this office in an inscription dated to 62 BCE.[97] Consequently, this office existed at least a generation before the Roman annexation of Egypt, but potentially up to 80 years prior.

In addition to this office, Pliny also makes reference to a Philo, prefect of King Ptolemy II, who was made responsible for acquiring the topaz (in this instance probably a reference to peridot) from a Red Sea island called Topazos (modern Zabargad/St. John's Island).[98] Maxfield has suggested that this *praefectus* may have been a forerunner to the later office of Prefect of Berenike which involved oversight of the Eastern Desert in Roman times.[99] This is not impossible, although it is unclear where this "prefect" stood in relation to the aforementioned offices.

Returning to the office of overseer of the Erythraean and Indian Seas, it has been noted in the preceding chapter that the term Erythraean Sea potentially indicated both the Red Sea proper and the wider Indian Ocean. The fact that these inscriptions refer to the Erythraean and Indian Seas suggests that oversight was not limited to the Red Sea proper, but included the Arabian Sea. Evidently, forms of commercial contact with India were happening with some regularity. Strabo's comments, although derogatory to the Ptolemies, confirm this. He states that while at Syene (c. mid-20s BCE) he heard reports of 120 vessels sailing from Myos Hormos to India each year, whereas under the Ptolemies only a few vessels ventured to carry goods to India. Strabo further mentions that Ptolemy XII, who ruled over Egypt with incompetence, was still able to raise a large annual tribute of 12,500 talents from Egypt, despite only 20 vessels annually daring to traverse the Red Sea.[100] These comments need to be understood

96 *SB* V 8036 = *I. Portes* 49; Otto and Bengtson (1938); Mooren (1972): 127–133; Ricketts (1982): 161–166–174/173 BCE; Sidebotham (1986): 8–9, 175; Sidebotham (2011a): 37; Habicht (2013): 203–205—second century BCE.

97 Cohen (2006): 49—*I. Philae* 52, 53, 56, 76; Ricketts (1982): 161; Bingen (2007): 288.

98 Pliny *NH* 37.32.108.

99 Maxfield (2001): 147. See Chapter 4.

100 Strabo 2.5.12, 17.1.13.

in the context of his desire to praise Augustus' good management of Egypt, in contrast to the previous Ptolemaic kings. The disparity between the Ptolemaic and early Augustan periods was likely exaggerated to make this point.[101]

This is not to deny that Strabo's comments can still be understood to indicate a significant uptake in commercial activity in the Augustan period. Nevertheless, attempts to go beyond the impressionistic and actually use the figures to quantify the difference between Ptolemaic and Roman trade is of dubious value.[102] Even if they could be taken at face value, and the differences were not exaggerated to place Augustus in a better light, do these figures represent an annual average or the specific number that Strabo happened to hear about in one year? What were the capacities of these ships and were they all Egyptian, as opposed to Arabian or Indian?[103] Should we imagine the number of ships to have increased by fivefold, fiftyfold, or a hundredfold in the space of the half-decade between Augustus' annexation of Egypt and Strabo's presence at Syene (mid-20s BCE)? There are no means of addressing these questions. It is, however, reasonable to accept that Strabo's statements reflect, in broad terms, an increase in the volume of trade during the latter first century BCE.

Ptolemaic Monopolies

One theory that has been employed to argue for a distinction between the Ptolemaic and Roman-era trading activities in the Indian Ocean is the idea of government monopolies on imports. It is suggested that the Ptolemaic state's desire to control the import of Indian Ocean goods suppressed free commercial activity, which was then unleashed in the less restrictive context of Roman rule.[104] A major basis for this argument is Strabo's description of Eudoxus of Cyzicus, who is twice said to have brought back goods from India only to have them seized by Ptolemaic monarchs. The problem with such a reading is that it is unclear to what extent the Ptolemies financed these expeditions, and what portion of the cargo Eudoxus rightly considered his own. In fact, at the conclusion of the second expedition, it is reported that Eudoxus lost out not because of some monopolistic policy, but because he attempted to misappropriate part of the cargo. Any investment he may have personally made seems to have been

101 Speidel (2015): 100, suggests that good relations between Augustan Rome and the Nabataeans improved security in the Red Sea, linking this to Strabo's comments.

102 Raschke (1978): 662.

103 Parker (2002): 70, is of the opinion that this is a distinct possibility.

104 Raschke (1975): 244; Whittaker (2004): 163, 167; McLaughlin (2010): 29, 169.

lost as a mild punishment for attempted theft.[105] In the case of the first confiscation, Strabo's later rebuke of Posidonius' account gives the implicit sense that Eudoxus may have been up to shady dealings here as well.[106]

It is also important to note that earlier ideas about the nature of Ptolemaic government monopolies have come under review, with scholars like Bowman highlighting the existence of free market enterprise.[107] Indeed, the mid-second century BCE venture to the Spice-Bearing Land (*SB* III 7169) attests to the existence of privately financed commercial activity in the Indian Ocean, which involved a range of individuals originating from across the Mediterranean world.[108] Ptolemaic elephant hunting activity may have been state-directed, but there is little substantive evidence that Red Sea commercial activities in the second or first centuries BCE were subject to the same kind of state planning.[109] It appears that the late Ptolemaic period represented a phase of increasing trade with India, which would then grow on an even more impressive scale after the Roman annexation of Egypt. This Roman period upsurge may be partially explained by a unified Mediterranean providing a greater market for Eastern goods.[110] The salient point is that the increasing level of Ptolemaic period trade should be seen as part of a broader upwards trend, and the basis for considerable growth in the Augustan period.

105 Kidd, *Posidonius*, 243–244—Strabo 2.3.4—σωθέντα δ᾽ εἰς Αἴγυπτον, οὐκέτι τῆς Κλεοπάτρας ἡγουμένης ἀλλὰ τοῦ παιδός, ἀφαιρεθῆναι πάλιν πάντα: φωραθῆναι γὰρ νενοσφισμένον πολλά. Thiel (1967): 19–21, notes that the Ptolemies may simply have been claiming their rightful property.

106 Strabo 2.3.5—πῶς δὲ ἐπιστεύθη τηλικαύτην χρείαν; πῶς δ᾽ ἐπανιὼν ἀφαιρεθεὶς πάντα παρὰ τὴν ἐλπίδα καὶ ἀτιμωθεὶς ἔτι μείζονα ἐπιστεύθη παρασκευὴν δώρων;

107 On earlier ideas about Ptolemaic monopolies see Rostovtzeff (1957) and Fraser (1972). More recently modified by Bowman (2010): 104. See also Manning (2011) who argues for a more complex view of the relationship between subsistence, command, and market aspects of the Ptolemaic economy.

108 Kidd (1988): 244.

109 For the view that Ptolemaic state activity in the Eastern Desert and Red Sea stimulated commercial exchange see von Reden (2011): 436–437. On monopolies relating to the incense/perfume retail market see Wilcken (1925); Sidebotham (1986): 5; and Evers (2016): 122, 149–152. Leasing of retail perfume monopolies to local private entrepreneurs took place in both the Ptolemaic and Roman periods in Egypt.

110 Casson (1989): 12; Kearney (2004): 42–46; Smith (2009): 88–89; Tomber (2008): 18.

Ptolemaic Egypt and the Port of Arikamedu

The port of Arikamedu in southeast India provides a good case for a more evolutionary transition between the Ptolemaic- and Roman-era commercial activities in the Indian Ocean. This site has produced over 500 fragments of Mediterranean amphorae, of which just over half are Coan, just over a tenth are Knidian, and just under a fifth are Rhodian. There are also many Dressel 2–4 amphorae and other forms, such as Dressel 6 and Dressel 20.[111] Grace has argued that some of the Coan amphorae at Arikamedu date stylistically to the late second century BCE, with the majority dating to the first century BCE. The Knidian and Rhodian amphorae are of the first century BCE, although some of the Rhodian fragments indicate a first century CE date. It has also been possible to date two Knidian amphorae stamps to the second quarter of the first century BCE.[112]

Further support for the position that some of this wine was exported in the Ptolemaic period comes from the fact that about 20 Coan and 11 Knidian amphorae fragments have been found in the southern sector. This part of the site has revealed material such as Indian megalithic pottery and is given a general date of the second century BCE (possibly earlier).[113] It is, however, necessary to be cautious, since it is not possible to know whether these amphorae fragments represent the consumption of wine in this period or the later dumping of refuse material in this area.[114] Nevertheless, at least on the basis of the stylistic evidence and the two Knidian amphorae stamps, it is clear that some form of direct or indirect exchange existed between Egypt and Arikamedu in the late Ptolemaic period. The other option is to assume that wines of many decades or even a whole century's vintage were exported during the Roman period, but this seems a less plausible explanation.

One of the reasons why Coan wine may have been shipped to Arikamedu is that a strong commercial connection existed between Egypt and Cos in the

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111 Will (2004a): 326–328; Will (2004b): 434–436; Williams (2004): 448; also Wheeler, Ghosh, and Deva (1946). By comparison the site of Pattanam (likely ancient Muziris) predominantly features Coan amphorae and Italian Dressel 2–4 amphorae, although the latter appears in a comparatively higher ratio—Tomber (2015): 386.

112 Grace cited in Will (2004a): 328–329; Will (2004b): 436. For discussion of the date of these amphorae see, Suresh (1992): 46; H. Ray (1994): 67; Begley (1996a): 22; Sidebotham (1996d): 101; Williams (2004): 444.

113 Wheeler, Ghosh, and Deva (1946): 22–27; Begley (1996a): 16–17; Begley (2004a): 4–6; Begley (2004b): 114, 159–160.

114 Tomber (2008): 149.

Ptolemaic period, especially with the importation of this type of wine.[115] It was also popular in Italy in the first century BCE, and continued to be found at sites such as Pompeii into the first century CE.[116] In addition to its popularity, the use of salt water meant it preserved well.[117] A Coan amphora could hold up to 44 litres, more than twice that of a Rhodian amphora (20 litres) and one and a half times that of a Knidian amphora (30 litres). Georgopoulou argues that Coan wine was quite cheap, citing a stele from Delos which lists the prices of wine at a festival.[118] However, it is not clear to what extent this apparent cheapness affected its value in Indian markets. Interestingly, there is evidence of Romans citizens from Italy transporting Coan wine to Alexandria in the latter half of the first century BCE, although this need not imply any direct connection to the Indian Ocean trade at this date.[119]

Coan wine was replaced by wine from Italy as indicated by the finds of Dressel 2–4 amphorae at this site. This type of amphora began to be manufactured in Italy (among other regions in the Mediterranean) from the late first century BCE, but it is unlikely that it was shipped to Arikamedu before the Augustan period. Very few of these amphorae are found in contexts earlier than the first century CE.[120] Interestingly, however, the Dressel 2–4 did not immediately replace Coan amphorae, as indicated by finds of pseudo-Coan amphorae. It appears that there was a chronological shift from Coan to pseudo-Coan, and then to Italian amphorae. The Coan amphorae are distinguishable by their greenish fabrics, whereas Italian Dressel 2–4 amphorae at Arikamedu had a 'black sand' fabric characteristic of the volcanic soil of the Naples region.[121] The pseudo-Coan amphorae (Dressel 3) were made in Italy, originating in Campania during the late first century BCE to the early first century CE. Some of them have a distinctive greenish surface that Will argues imitated the greenish fabric of the Coan amphorae.[122]

115 Sherwin-White (1978): 226.
116 Pauls (2004): 333; Timby (2004): 385.
117 Sherwin-White (1978): 232–233, 236–237. On its popularity see Cato *De Agri Cultura* 112; Strabo 14.1.15, 2.19; Horace *Sat.* 2.8.8–9; Athen. 1.32a; *contra* Dioscorides *MM* 5.9—who says it went bad quickly and caused belly-ache. On methods for preserving wine see Brancaccio and Liu (2009): 225.
118 Georgopoulou (2005): 181; also Grace (1961): 22.
119 Sherwin-White (1978): 251–252.
120 Slane (1991): 204–205.
121 Will (1991): 151–156; Williams (2004): 446; Williams and Peacock (2005): 140–142.
122 Will (1996): 318; Will (2004a): 328–329; See also Sherwin-White (1978): 232–236, on Coan amphorae.

This pattern may indicate that, due to market expectations at Arikamedu, the Coan wine could not simply be substituted for Italian wine without some kind of transition, and that the containers of the pseudo-Coan amphorae were perhaps deliberately used for their similarity to the earlier Coan types. The wines in these containers may even have been similar in taste, as it is known that Italian wine-makers were imitating the method used to make Coan wine.[123] There is no reason to assume that the appearance of Italian amphorae at Arikamedu represents the complete displacement of Graeco-Egyptian merchants with Italians during the Augustan period and early first century CE. The transition observable at Arikamedu likely reflects the declining commercial connections between Cos and Alexandria, coupled with declining prosperity and natural disasters on the island. This is in contrast to the increasing commercial connections between Alexandria and Puteoli.[124]

In addition to this wine trade originating in the late second or first century BCE, some have argued that finds of Rouletted Ware (produced from the second to first centuries BCE), although thought to be produced broadly within south-east India and Sri Lanka, show Mediterranean influences. It has been suggested that this influence may be the result of Indian contact with the Persian Gulf.[125] However, the fact that these ceramics started to be produced in the second century BCE, a period of increasing Indo-Egyptian contact but declining Seleucid control of the northern Persian Gulf region (lost to the Parthians c. 140s BCE), may suggest that an Egyptian-Red Sea link is to be preferred (although contact from either route need not be seen as mutually exclusive). Indeed, the simultaneous presence of Rouletted Ware and paddle-impressed ware at Berenike, Arikamedu, and Khor Rori (Moscha Limen) seems to indicate some form of link between these ports.[126] In total, the evidence suggests that connections between Egypt and Arikamedu developed in the Ptolemaic period and continued into the Roman period. The presence of pseudo-Coan amphorae in particular emphasises the transition between these periods rather than any radical break.

123 For the imitation of Coan style wine in Italy see Cato *De Agri Cultura* 112.

124 Fraser (1972): 151–159; Sherwin-White (1978): 131, 277; Gysens (1994): 78; Ciaraldi (2007): 154–155.

125 Ford et al. (2005): 393–398; Coningham, Manuel and Shoebridge (2015): 43–46 (indigenous ware); H. Ray (1994): 59–61; Magee (2010): 1044, 1051–1053 (Mediterranean influence, but indigenous production); Krishnan and Balvally (2015): 233–234 (the ware may also have originated form the Ganges region).

126 Avanzini (2016): 117–118, 122—the presence of Rouletted Ware in the earliest layers at Khor Rori indicates very early links with India.

Ptolemaic Routes and Facilities

Elephant hunting may have provided the initial impetus for the establishment of ports on the Red Sea coast and way stations and tracks through the Eastern Desert, but these would continue to be used for trade purposes in both the Ptolemaic and Roman periods. Two major ports connected to the exchange of goods between the Indian Ocean and Mediterranean worlds—the ports of Myos Hormos and Berenike—were clearly still in use by the late Ptolemaic period, although the Roman period saw major phases of development at these sites.

Myos Hormos and Berenike

The Ptolemaic-era foundation of Myos Hormos is apparent from the literary sources. However, excavations at Quseir al-Qadim during the late 1970s and early 1980s revealed only limited Ptolemaic material, and even when later excavations by the University of Southampton (1999–2003) did unearth a bit more material, it proved difficult to access (partially because of lagoon sediment).[127] The coins and pottery, which have been attributed to the Ptolemaic period, were found near the harbour, suggesting that much of the Ptolemaic settlement was lost to the sea or buried under silt.[128] Further complications arose from the difficulties of precisely distinguishing between Ptolemaic and early Roman material. For example, some of the pottery identified as Augustan may, in fact, be of Ptolemaic date.[129] Likewise, the bulk of the roughly 189 ancient ceramic lamps identified at the site are dated, in broad terms, to the Ptolemaic or early Roman periods.[130]

Coins, in theory, offer a clearer indication of their period of production, if not their movement to Myos Hormos. Unfortunately, the coins discovered during both excavations frequently proved difficult to identify because of corrosion from the acidic sand in which they were retrieved. Only about 40 coins from the Ptolemaic and Roman periods can be identified to a specific ruler or at least narrowed down to a likely period. The four identified Ptolemaic coins represent 10 per cent of the sample. Whereas this is 12.5 per cent for the Augustan period and 50 per cent for the first century CE. This drops down to 10 per cent for second century coins and 2.5 per cent for the third century.[131] The sample is,

127 Pricket (1979): 296; Whitcomb and Johnson (1979a): 5; Peacock and Blue (2006b): 65.

128 Sidebotham (2011a): 143.

129 Peacock and Blue (2006d): 174.

130 Peacock (2011a): 47.

131 Peacock (2011b): 85–87—Chicago excavation—1 Ptolemy III; Southampton excava-

admittedly, very small, and conclusions drawn from it should be treated with caution. That said, the chronological distribution does seem to reflect other evidence that points to a high point for Mediterranean participation in the Indian Ocean trade during the first centuries CE.[132] The low numbers for the second and third century CE should caution us against being too dismissive of the significance of Ptolemaic era activity.

It is undoubtedly the case that the Augustan period saw notable construction activity at Myos Hormos, as can be seen from a major clearance of the mangrove swamps around the northern part of the harbour area followed by the construction of seawalls (foundations reveal pottery of a late first century BCE to late Augustan date). The development of a workshop with a furnace for industrial activity is seen from Trench 10, which overlaid an earlier structure possibly used for similar purposes, and, located near to this, a pit revealing Roman, and a few earlier Ptolemaic pottery sherds. Trench 7 has revealed evidence of a jetty, constructed using amphorae filled with coarse materials (amphorae fragments, gravel, and occasionally charcoal) to form the foundations. A late Augustan or early first century CE date has been proposed for this structure, but it is of interest that some of the vessels used in the construction are of possible Ptolemaic date.[133] The clearing of parts of the site and construction work can undoubtedly be linked to increased activity during the Augustan period, but the Ptolemaic material finds, limited as they are, also attest to the pre-existing operation of this port.

The port of Berenike has revealed comparatively more Ptolemaic material than Myos Hormos. In earlier excavations the excavators did not always have sufficient time to unearth earlier Ptolemaic layers (and in some cases it was not safe to do so), but more recent work is throwing further light on this period.[134] Interpretation of the Ptolemaic period at Berenike also suffers from the fact that some of the Roman occupation levels covered the earlier Ptolemaic material, though in the western parts of the site the Ptolemaic levels are just below the surface.[135] The excavators did notice some distinctions between the Ptole-

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tions—1 Ptolemy VI Philometor; 2 Cleopatra VII. See also Peacock and Blue (2006c): 73; and Sidebotham (2011c): 353–360.

132 Cobb (2015b): 362–418.

133 Peacock et al. (2006b): 67–79, 87–90; Tomber (2016): 45.

134 Sidebotham (2000a): 145–146; Sidebotham (2007a): 47, 54; Sidebotham and Wendrich (2007c): 368. For more recent excavations which have further uncovered parts of the Ptolemaic port see Sidebotham and Zych (2016): 7–8, 16–17, 21–24, 27, 32. See also Zych et al. (2016): 322–326.

135 Barnard and Wendrich (2007): 15; Sidebotham (2007a): 44 (Ptolemaic levels covered by

maic and Roman structures, with the frequent use of clay as a construction material in the former and a greater use of coral head blocks in the latter. However, this contrast is most apparent between early Ptolemaic and late Roman buildings; unfortunately, the structural remains for the late Ptolemaic and early Roman periods are more limited.[136] The existence of residual Ptolemaic material alongside later Roman occupational material indicates continuous occupation from the Ptolemaic period onward, rather than a break.[137] The continuation of an orthogonal pattern in the early Roman street plan seems to indicate continuity with the earlier Ptolemaic layout of the site, while the use of the harbour area south of the Ptolemaic industrial zone and the area around the Great Temple (the so-called Serapis Temple) may also be reflective of continued (organic) development at the port.[138]

On the western side of Berenike there is evidence for early military defences (third to first centuries BCE), including a rectilinear tower, a robbed portion of city wall, and a possible drawbridge, as well as hydraulic facilities.[139] In addition, excavations in this western section of the site have revealed an industrial quarter. One of the activities undertaken in the Ptolemaic period was lead working, in order to produce sheets for protecting the wooden hulls of merchantmen and possibly also to line hydraulic tanks.[140] One trench alone produced as much as 95 kilogrammes of lead, and overall the Ptolemaic industrial zone produced as much as 110 kilogrammes. A possible lead brail ring has also been found. Other industrial finds include iron and charcoal in a second century BCE layer, although copper alloy and bronze nails appear in greater numbers.[141] Interestingly, the remains of a probable Ptolemaic period cistern have been found, and its design shares similarities with some cisterns at *praesidia* (fortlets) in the Eastern Desert.[142] High-value material was also being worked

trash); Barnard and Rose (2007): 183 (later reuse); Sidebotham (2015b): 153 (possibly robbing of parts of Ptolemaic enceinte during early Roman period).

136 Sidebotham (2007a): 37, 39, 69 (construction materials); Sidebotham (2011a): 56; Tomber (2016): 46–47.

137 Sidebotham (2000a): 145–147; Sidebotham (2007a): 51, 56, 77; Tomber (2011): 115.

138 Sidebotham, Hense and Nouwens (2008): 173; Sidebotham (2011a): 57–61; Sidebotham and Zych (2012b): 137; Sidebotham (2014): 614–616; Rądkowska and Woźniak (2011): 20, 23–24.

139 Sidebotham and Zych (2010): 31–32; Sidebotham (2015a): 17, 19; Sidebotham and Zych (2016): 21–22; Zych et al. (2016): 322–325.

140 Sidebotham and Wendrich (2007b): 2; Hense (2007): 217; Sidebotham (2007a): 37.

141 Hense (2007): 216–217; Sidebotham (2007a): 40–41; Sidebotham (2008): 307; Sidebotham and Zych (2010): 10–11.

142 Sidebotham (2007a): 33–34.

at the site, as evinced by a turtleshell and a small scarab made of peridot found in a Ptolemaic-era trash deposit.[143]

In addition to industrial activity, there is evidence for material that can be seen as representative of domestic activity or personal possessions. For example, tablewares have been found in some of the second century BCE layers, including imports from Rhodes. Other finds include objects probably related to clothing or personal appearance, like a bronze fibula, two bronze tweezers, and some bronze pins. Demotic ostraka indicate that Berenike continued to be occupied in the late Ptolemaic period, while a Ptolemaic silver tetradrachm can be assigned a date between 170–51 BCE.[144] The material evidence for imports in the Ptolemaic period at Berenike is clearly less substantial than that of the Roman period, though this is to be expected given the greater scale of trade taking place in the latter period.[145]

It has been suggested that Myos Hormos was a more important port than Berenike in the Augustan period, the latter having fallen into disrepair and only to be restored during the course of the reign of Tiberius. Several pieces of evidence have been cited to support this theory, including the large number of Nikanor ostraka referring to the transport of goods to Berenike in Tiberius' reign, the earliest cartouches in the Great Temple dating to this period, and the fact that Strabo states that Myos Hormos was the more significant of the two ports (mid-20s BCE).[146] There may be some merit to this notion given the notable amount of construction and clearance activity at Myos Hormos datable to the Augustan period, although the archaeological evidence would suggest this view should not be taken too far.[147] This port also had the advantage of offering a shorter crossing to Koptos. However, during the peak period of trade in the first century CE, when some very large vessels were operating, the

143 Sidebotham and Zych (2012a): 40.

144 Hense (2007): 217; Sidebotham (2007a): 40–43, 63; Sidebotham and Wendrich (2007c): 374; Bagnall, Helms and Verhoogt (2005): 103–104—*O. Ber.* 251–253.

145 Tomber (2008): 71. Imported and Egyptian amphorae, beads, a blue glass pendant, a terracotta figurine, and other finds have been identified recently at a Ptolemaic era trash dump in Berenike—Zych et al. (2016): 326.

146 Sidebotham (1986): 52–53—see also Sidebotham (2011a): 62; Sidebotham (2008): 315; Wilson (2015): 20. For the theory that Berenike did not operate unit after the purported destruction of Aden (Strabo 17.1.45) see McLaughlin (2010): 75; McLaughlin (2014): 83. On the Great Temple it should be noted that this seems to have been in operation from at least the second century BCE, but with some restoration in the first century CE—Hense, Kaper and Geerts (2015): 587.

147 Sidebotham (2015b): 146.

more southerly Berenike would have been more suitable, given the difficulties of sailing against the prevailing northerly winds (particularly above a latitude 18°/20° N; Berenike is located about 24° N, whereas Myos Hormos is about 26° N).[148]

It would be a mistake, however, to assume that both ports did not continue to be in operation between the late Ptolemaic and Roman periods. Caution should also be used in employing the Nikanor archive as a sure guide to activity at the two sites. Of the 83 ostraka from this archive, it is possible to read the name of the port at which the goods were received on only 67 of them. There are 37 (55 per cent) that name Myos Hormos as the destination and 30 (45 per cent) that mention Berenike.[149] The highest number of ostraka referring to Berenike come from the reign of Tiberius (12) and the highest number for Myos Hormos from the reign of Claudius (23), while during the reign of Augustus they are roughly equal (Myos Hormos 2, Berenike 3).[150] If these ostraka are being used to suggest an upsurge of activity in Berenike in the reign of Tiberius, how are the high numbers of ostraka referring to Myos Hormos in the reign of Claudius to be explained? It may be best to assume that these ostraka are not a sure guarantee of the fluctuating popularity of the two ports during the Julio-Claudian period, and certainly not a definitive indicator of construction activity. It is better to consider these ostraka in the context of other evidence, rather than look at them in isolation.

The Desert Routes and the Nile Emporia

In the Ptolemaic period the port of Berenike, and other sites, like Marsa Nakari (possibly ancient Nechesia), were connected to the Nile emporium of Apollonopolis Magna (Edfu) by well-travelled tracks. These tracks, or at least portions of them, had been in use prior to this period.[151] Initially frequented in the early Ptolemaic period by elephant hunters, they came to be increasingly utilised by merchants and travellers. Edfu was clearly an important centre for the early Ptolemaic kings, who built a new temple, settled colonists (*klērouchoi*), and also established a royal bank at this site.[152] The city was connected to these Red Sea ports via a series of tracks that have square-shaped cairns (stone markers) laying out the route, though there are not many preserved signal or watchtowers.

148 See chapters 3, 4 and 5. De Romanis (2016): 101.

149 See Tait (1930)—*O. Petrie* 220–303.

150 Augustus—Berenike (B) 3—Myos Hormos (MH)—2; Tiberius—B 12—MH 6; Caligula—B 3—MH 3; Claudius—B 7—MH 23; Nero—B 2—MH 3; late Julio-Claudian—B 3.

151 Sidebotham (2016): 915.

152 Manning (2010): 113.

A stele set up by Rhodon, son of Lysimachos, in 257 BCE appears to have been intended as a distance marker. It is located at Bir ʾIayyan, 97 kilometres east of Edfu, on the Edfu-Barramiyya road.[153]

The remains of five Ptolemaic stations along these tracks reveal features including walls, towers, cisterns, and internal rooms, notably at Barramiyya (on the Edfu-Marsa Nakari route) and Samut (on the Edfu-Berenike route)—though the station at Abu Midrick appears to have walls, but no towers.[154] The station of Abu Midrick had two cisterns capable of collectively holding about 88,000 litres, while a similar station at Rod Umm al-Farraj on the Edfu-Marsa Nakari road shows traces of Ptolemaic to early Roman occupation.[155] The greater use of the tracks between Edfu and these Red Sea ports during the Ptolemaic period is suggested by inscriptions left behind at the chapel of el-Kanais (the Paneion), which is about 50 kilometres from Edfu. The site has 85 Ptolemaic inscriptions, while only six are Roman.[156]

Edfu's importance was to decline in favour of the emporium of Koptos (modern Qift), which acted as the main centre connecting the Nile to the Red Sea ports during the Roman period.[157] It has been suggested that routes leading from Koptos developed during the Roman period, since many graffiti can be dated to this time, whereas Strabo's failure to mention stations along the Koptos-Myos Hormos route has been taken as an indicator that they had not yet been built in his time.[158] Young specifically connects the development of routes leading from Koptos to the reign of Tiberius, partially on the basis of an inscription mentioning construction work along these routes and at the port of Myos Hormos. However, it should be noted that the date of this inscription is contested and a Flavian date is quite possible, especially in light of the archaeological and inscriptional evidence from stations lining the Koptos to Myos Hormos and Berenike routes.[159]

153 Bagnall et al. (1996): 317–322; Cohen (2006): 320–321; Wright (2003): 228–229.

154 Wright (2003): 228–229; Reddé (2006b): 237–238.

155 Sidebotham, Hense, and Nouwens (2008): 315, 332, 339.

156 Cohen (2006): 324 n. 6.

157 On a pillar inscription at el-Kanais mentioning the cleaning of well shafts (c. Ptolemy X or XII) see A. Bernand (1972): no. 12; Mairs (2011): 158.

158 A. Bernand (1972): 15; Wilson (2015): 14–16, 19 (graffiti); Sidebotham (2011a): 160.

159 Young (2001): 46–47; *ILS* 2483 = *CIL* III 6627. On dating see Kennedy (1985): 157; Syme (1995): 249; (Augustan); Young (2001): 44 (Tiberian); Cuvigny (2006b): 267–273; Cuvigny (2006c): 353–357; Cuvigny (2011b): 5 (Julio-Claudian); Alston (1995): 30 (*contra* Alston (2007): 3); Sidebotham (2011a): 154; Sidebotham (2016): 916 (Flavian).

There are reasons to doubt the notion that the development and use of the routes from Koptos did not take place until the Roman period. Ptolemaic-period inscriptions have been found along these routes. At Abu Kuway in the Wadi Hammamat, some date as far back as the third century BCE and include references to non-Egyptian merchants such as a Cypriote and a Phoenician. Ptolemaic-period Demotic graffiti have been found elsewhere in the Wadi al-Hammamat, while other Ptolemaic texts include hieroglyphs on a column at the temple of Min at Fawakhir.[160] Bülow-Jacobson has argued that the station of Simiou (Sayyala) is likely to have been founded by Simmias, an explorer sent by Ptolemy III to find elephant hunting grounds in East Africa. He also notes that Philotera, the deified sister of Ptolemy II, had a cult at the station of Simiou.[161] The style of construction used at the fortlet of Bir Sayyala is comparable to that of the Ptolemaic period, while ostraka indicate that the fort was still being occupied under Antoninus Pius. Repeated reconstruction of the ramparts attests to its lengthy occupation.[162]

There is, in fact, good reason to believe that the routes leading from Koptos were increasingly being exploited by the mid to late Ptolemaic period. Excavations at Koptos have revealed an upsurge of building activity in the mid-second century BCE, and continuous occupation between the late Ptolemaic to Roman periods. This centre's importance at this time is also reflected in the fact that 5 per cent of the ceramics excavated were imported, which is high in comparison with other Ptolemaic sites in Egypt, such as Naucratis.[163] The increasing connection between Koptos and Myos Hormos may also be inferred from Strabo's statement that in his day this port was held to be important.[164] Since this information was based on his experience of Egypt in the mid-20s BCE, it should be questioned whether such a development was the result of five years of Augustan rule. With the effective abandonment of the acquisition of elephants from East Africa during the second century BCE, Murray and Warmington note that there was no longer the same need to use the shorter route between Berenike and Edfu (this shorter route spared the elephants an overly lengthy desert crossing). It subsequently made more sense for the routes from

160 Cuvigny (2006b): 277; also Brun (2006b): 191. See also the ostrakon *O.Faw.* 29.

161 Bülow-Jacobson (2006a): 53, 56.

162 Reddé and Brun (2006): 132–133.

163 Herbert and Berlin (2003b): 44–45, 127—they also note the construction of a stone gate by Ptolemy VIII.

164 Strabo 17.1.45. For debate over the use of the Koptos-Berenike route in the Ptolemaic period see Bernand (1972): 15; Lassányi (2012): 249; Bülow-Jacobsen (2013): 559–561; Cuvigny (2011b): 4–5; Cuvigny (2014): 183; Tomber (2017): 540.

Berenike and Myos Hormos to terminate together at Koptos.[165] In addition, it has been suggested that the uprising in the Thebaid between 206–187 BCE also exacerbated the decline of the Edfu-Berenike route, which encouraged greater use of the routes from Koptos once the Thebaid had been restored to Ptolemaic control.[166]

Summary

Initial Ptolemaic interest in the Red Sea was influenced by the desire to acquire elephants for warfare, and led to the foundation of many ports on the coast and routes leading across the Eastern Desert. However, commercial interest had been a factor from the start, and by the mid-late Ptolemaic period, many trade networks connecting Egypt to East Africa, southern Arabia, and India had been established. Initially, commercial exchange between Egypt and India seems to have relied on intermediaries or trading hubs that acted as midway points of contact. However, an increasing volume of direct voyages had begun to take place by the late second and early first century BCE. This was the result of growing knowledge of the western coast of India and a greater willingness to utilise the monsoon winds (winds which the Greeks were possibly aware of since the early Hellenistic period). The notion that the Ptolemaic state attempted to monopolise this eastern trade does not seem justified from the evidence, and when the Romans took over Egypt in 30 BCE, private commercial trade was already in place.

The port of Arikamedu in particular is indicative of the evolutionary rather than revolutionary developments between the Ptolemaic and Roman periods. Networks of exchange, either direct or indirect, had developed between Egypt and Arikamedu as early as the end of the second century BCE, or at least by the beginning of the first century BCE. This is indicated by the finds of Coan and Knidian amphorae, and possibly also by the influence of Mediterranean ceramic styles on indigenous Rouletted Ware. The transition observable in the export of Coan, then pseudo-Coan, and eventually Italian Dressel 2–4 wine vessels reveals that merchants did not impose immediate changes on the market, but adjusted to expectations, and potentially tastes, over the course of the late Ptolemaic and early Roman periods.

165 Murray and Warmington (1967): 29–30.

166 Durand (2012): 87.

These Ptolemaic-era developments, of course, do not belie the major impetus given to Mediterranean involvement in the Indian Ocean trade resulting from the Roman annexation of Egypt. There is no doubting that an upsurge in trade occurred. Major construction activity in the Augustan period and the first century CE can certainly be attested at Myos Hormos and Berenike, although there was no break in occupation at these sites. Likewise, the Koptos to Myos Hormos and Berenike routes, which had already been important since at least the late second century BCE, were subject to development over time, especially in the Flavian period. The salient point is that the legacy left by Ptolemies was built upon during the Roman period, not radically overturned.

CHAPTER 3

Organisation and Finance

When the Romans took direct political and administrative control of Egypt in 30 BCE, the Red Sea region was already integrated into wider Indian Ocean trade networks, and merchants from Egypt and the wider Mediterranean had been participating in this commerce for some time. The aforementioned loan agreement financing a venture to the Spice-Bearing Land indicates that, even around 150 BCE, those involved in its financing, organisation, and operation were not just from Alexandria or, more broadly, Egypt, but from the wider Mediterranean world (Carthage, Italy, Lacedaemonia, and Massalia). This, however, raises the following question: did Roman annexation bring about a far greater influx of new finance and involvement from groups outside Egypt, particularly Italians, or were the social and political elite of Alexandria still predominant? It is suggested in this chapter that while several plausible hypotheses point to the involvement of Italian mercantile families, the firmest evidence still indicates a significant role for the social and political elite of Egypt. This group was not marginalised by Roman annexation, nor does the evidence suggest a dependence on Italian finance—although this does not exclude cooperation between the two groups.

The level of resources required to participate in this trade and its influence on organisational structures is also examined in this chapter. It is apparent that merchants needed significant financial resources, or at least the backing of financiers who possessed such capital. The more powerful and wealthy had agents to take care of the supervision, protection, and transportation of their goods. However, it is clear that loans were offered to those who did not possess all the capital required. There is also reason to think that shipowners operating in the Indian Ocean chartered out space on their vessels, while some merchants pooled their resources and formed consortia. Thus, it need not be assumed that the trade was the sole prerogative of those whose wealth could be counted in the millions of *sestertii*. In addition to those who possessed, or could access, large amounts of capital for extended, long-distance voyages, there were also others involved in supplying the ports and engaging in economic activity at these sites.

The third area to be addressed is the types of ships employed by Mediterranean merchants operating in the Indian Ocean, the materials employed for their construction, and the practical and logistical issues faced by those building and repairing them. The size and nature of these vessels and the require-

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ments of keeping them operational also had a significant impact on the organisation of the trade and the types of goods being exchanged. It appears that very large ships, with capacities of several hundred metric tonnes, were being used. Large, solidly built ships were required to withstand the winds and currents of the Southwest Monsoon (which drove the ships east), and, as a result, a significant amount of space was available for various goods in kind, including large, bulky items.

Merchants and Financiers

Understanding the identity of the Roman merchants who participated in the Indian Ocean trade is fraught with problems. These problems arise both from the limits of the evidence and the difficulties faced in interpreting it. Identities are not static, and people often present themselves and are interpreted by others in a wide variety of ways. The difficulties involved in attempting to identify the "ethnic" identities or socio-economic statuses of individuals from the ancient world have long been noted.[1] For a start, many individuals in the ancient world would have conceived of identities based on linguistic and cultural habits, rather than what we might now term ethnicity.[2] However, language use is by no means a sure guarantor of identity. This is apparent when studying Mediterranean participation in the Indian Ocean trade. Greek was clearly an important *lingua franca* for those Mediterranean merchants and financiers involved in the Indian Ocean trade (and for many also their first language), but how many would have considered themselves Greeks as opposed to any other identity?[3] A good example of this issue is seen from a Greek inscription in the Hoq Cave on Socotra, where an individual rendered his name in Greek as Aukar (AYKAP), which is likely a rendering for the Aramaic Abgar.[4] Another question arises: does the holding of *tria nomina* with mixed appellations indicate someone of formerly servile origin, or a *peregrinus* who has been granted citizenship? These issues certainly do not make it impossible to understand the

1 See Derks and Roymans (2009).

2 Seland (2013): 379.

3 Greek was not the only *lingua franca* in use, Sanskrit was very important for Indian merchant (at least from the second century CE onwards)—Strauch (2012): 262. It is likely that the services of translators were often needed. A possible example of someone engaged in this profession is Papiris, a secretary and translator, who is recorded as the father of a dedicant on an inscription from Berenike—Sidebotham and Zych (2012b): 143; Sidebotham (2014): 620.

4 Strauch et al. (2012): 205–206.

different groups and individuals who were involved in this trade, but it does mean the evidence should be treated with caution.

Graeco-Egyptians

The term Graeco-Egyptian is employed here as a convenient label for those who possessed Greek or Egyptian (or combined) appellations and, as far as can be discerned, were residents of Egypt. How they perceived themselves is in most cases beyond recovery. In spite of the Roman annexation of Egypt, there is no evidence to suggest that Graeco-Egyptian merchants were in any way displaced from their important roles in organisation, financing, and practical operations. Indeed, based on his experiences in Egypt (mid-20s BCE), Strabo identified the merchants of Alexandria as the ones who sailed with fleets to India.[5] This association with "Egyptians" could still be found in the early to mid-third century CE, when Philostratus was writing his account of the first-century sage Apollonius of Tyana.[6] In Book 6, the sage Apollonius is holding a conversation with a young man named Nilus. During this conversation, the latter comments on how his father was once a captain of a ship, one of the ones which the Egyptians send to India.[7] The account of Apollonius' activities in Philostratus' work is undoubtedly largely fictional, but, nevertheless, these comments can be taken as reflective of the assumptions made by educated members of the Graeco-Roman elite about those conducting the trade.[8]

A Greek inscription from the Hoq Cave on Socotra, which was likely inscribed around the period when Philostratus wrote the *Life of Apollonius of Tyana* (c. 220–230 CE), also attests to this Graeco-Egyptian connection to the Indian Ocean trade. In this memorial graffito, a religious dedication is made by a Septi(mios) Paniscos, a shipowner (*naukleros*). It is suggested by Bukharin that Septimios is not a *praenomen* but a *nomen*, since the former had largely fallen out of use in inscriptions by this time, and that Paniscos (a very common name in Egypt) is his *cognomen*. A later graffito was also set up by an Alexandros (perhaps baptised) Petros, dating from around the fourth century CE.[9]

Evidence from the Nikanor archive certainly suggests that in the Julio-Claudian period Graeco-Egyptians were regularly receiving goods at the Red Sea

5 Strabo 2.5.12.

6 For issues of genre see E. Meyer (1917); Anderson (1986); Anderson (1996); Kemezis (2014). On dating see Jones (2002): 759–767; Bowie (2009): 29.

7 Phil. *VA* 6.16.3.

8 Phil. *VA* 3.32.1–2—Here the Egyptians are presented as bringing (biased) information about the Greeks to India.

9 Bukharin (2012a): 495–499.

ports, either on their own account or as agents for others. From the collection of 84 ostraka, 67 of which have surviving references to individuals (including repetitions), 32 of them record the accounts of Graeco-Egyptians. Another seven of these ostraka mention individuals granted citizenship (*tria nomina* with mixed-appellations); a further 16 are associated with (possible) imperial freedmen or slaves; and three ostraka refer to soldiers receiving goods. There are only six or seven that reveal names that could potentially belong to Italian merchants or agents, and, admittedly, even here there is some uncertainty due to the fragmentary nature of the ostraka.[10]

The mid-first century CE Berenike customs passes also reveal the prominent involvement of the Graeco-Egyptian population. Among the ostraka of the 1994–1998 seasons at Berenike, there are 81 that mention names, 34 of them Egyptian and 29 Greek. The Egyptian names have strong associations with cults based in Koptos, such as Peterminis, 'the one given by Horus-Min'. The Greek names consisted of theophoric examples (Hellenic renderings of Egyptian gods) and common Greek and Macedonian names, such as Kastor and Leostratos.[11] This also largely appears to be the pattern for the Berenike ostraka unearthed in the 1999–2001 seasons, with 36 Egyptian and 38 Greek names appearing.[12] Only 11 ostraka from the 2009–2013 seasons seem to be customs passes.[13] It is necessary to be cautious in interpreting these ostraka, since it is not always clear whether those in receipt of the goods were operating on their own behalf or looking after the interests of others. Nevertheless, the impression given by these ostraka is that many Graeco-Egyptians were involved in the transport and assembling of goods at the Red Sea ports.

There is also evidence to indicate that Alexandrian-Egyptian elites were involved in financing trading ventures in the Indian Ocean. The Nikanor ar-

10 Graeco-Egyptian/Jewish—*O. Petr.* 222, 223, 224, 227, 228, 229, 230, 232, 233, 234, 234, 241, 244, 248, 250, 252, 253, 255, 256, 260, 264, 267, 268, 269, 270, 277, 282, 284, 287, 291, 294, 297;—Possibly given citizenship—257, 271, 275, 276, 288, 295, 296;—Thought to be Imperial freedmen/slaves—220, 221, 225, 237, 238, 239, 242, 247, 258, 265, 266, 280, 285, 286, 290, 292;—Possible Italian merchants—240, 246, 254, 259?, 261, 281, 293—for the difficulties of identify the latter see below.

11 Bagnall, Helms, and Verhoogt (2000b): 4, 8, 24–27, 38, 40, 48; *O. Ber.* 4, 13, 42. On the high proportion of Egyptian theophoric names (commonly found in Koptos) from the 2009–2013 finds see Ast and Bagnall (2016): 10–11.

12 Bagnall, Helms and Verhoogt (2005): 9–11.

13 *O. Ber.* 481–491. In these ostraka the name Andouros (Latin?) appears 3 times, Serapion (Greek) 3 times, Pakoibis (Greek) 1 time, and Psenapathes (Egyptian) 1 time—Ast and Bagnall (2016): 180–183. In *O. Ber.* 488, Andouros appears to be operating in an administrative role, in the other two cases it is unclear.

chive reveals that Marcus Julius Alexander, a Roman citizen and rich Jewish Alexandrian, had various agents receive goods on his account at Myos Hormos and Berenike between 37 and 43/44 CE.[14] His brother Tiberius Julius Alexander, was *Epistrategos* of the Thebaid in 42 CE and Prefect of Egypt from 66–69 CE (Tiberius, at least, was non-practicing).[15] This family possessed significant financial resources; their father Alexander Lysimachos was able to lend 200,000 *drachmae* to the Herodian royal family and to donate ornate gold and silver decorations to the Temple in Jerusalem.[16] Alexander Lysimachos was also an *arabarch* in the reign of Tiberius. Wilson postulates that it may have been one of the responsibilities of the *arabarch* to sell the goods the state had acquired from the *tetarte* (25 per cent tax) at auctions in Alexandria—possibly the government farmed out these levied goods to the *arabarch*, who might hope to make a profit from their sale.[17]

Other prominent individuals, if less well known, include the matrons Aelia Isidora and Aelia Olympias, who, along with Apollinarios the *eparchos*, set up an inscription at a temple in Medamoud (ancient Madu, 8 kilometres north of Luxor) during the second century CE:

> To the great goddess Leto, Aelia Isidora and Aelia Olympias, distinguished matrons, *naukleroi* and merchants of the Red Sea, together with Apollinarios the *eparchos* of … of Olympias and (Isidora) both … dedicated (this).[18]

These *matronai stolatai* may have received citizenship under Hadrian, and they could evidently conduct their business affairs without a guardian. It has been suggested that the use of the term *naukleros* indicates that these women either owned or chartered merchant ships.[19] It is not clear what role Apollinarios played in their partnership, but the fact that he was an *eparchos* suggests he may have been the head of an administrative district.[20] A further explicit refer-

14 *O. Petr.* nos. 252, 266–267, 268(?), 270(?), 271, 282. It was not unusual for state officials to also have private commercial interests in both Ptolemaic and Roman periods. See Rabirius Postumus—Cicero *pro Rabirio Postumo* 40; and Q. Ovinius—Orosius 6.9.20.

15 Sidebotham (1986): 84–85; *OGIS* 663 (Tiberius Julius Alexander as *Epistrategos*).

16 Rathbone (1983): 89; Wilson (2015): 26; Tchernia (2016): 49; Joseph. *AJ* 5.8.5.

17 Wilson (2015): 25–26—this parallels the practice in Syria where a 25 % levy was farmed to the *arabarchs*.

18 *SEG* VIII 703—trans. from Young (2001): 58.

19 Young (2001): 58–59.

20 Ἐπαρχεία—office of *praefectus*.

ence to an Alexandrian *naukleros* is a well-written graffito (post-212 CE?) left by an Aurelius Sarapion who made a votive dedication at the fortlet Dios on the Koptos-Berenike route.[21]

It is apparent from this evidence that some of those with wealth and social and political status among the Egyptian elite had financial interests in the trade, and in the case of Aelia Isidora, Aelia Olympias, and Apollinarios, were happy to advertise their association with it. Other Graeco-Egyptian merchants can also be seen making dedications, although the status and position of these individuals cannot easily be identified. This includes a Parthenios, son of Paminis, who was active at Myos Hormos and Berenike between 26 and 42 CE (as indicated by the Nikanor archive) and appears to have made a dedication to Isis and Kronos at Koptos in July, 32 CE.[22] A woman named Philotera, daughter of Patentais (an Egyptian name), made a dedication to Zeus at Berenike in the reign of Nero (although the purpose is not specified), while a Severus, son of Moschion (a Greek name), who refers to himself as a *naukleros*, left an inscription at el-Kanais.[23]

Jewish Egyptians

The Jewish population of Egypt was probably involved in the Indian Ocean trade, but the limited evidence makes it difficult to judge to what extent. The population of Alexandria had included a substantial Jewish component since Ptolemaic times, and it seems some members of this community were involved in activities relating to the Red Sea region in this period.[24] Two Greek inscriptions at el-Kanais mention a Theodotos, son of Dorion, and Ptolemy, son of Dionysios, both of whom describe themselves as Jews, the former giving thanks to 'God' (Θεός) for being saved from the sea.[25] Whether they were involved in trade or in the acquisition of elephants for the Ptolemaic government is unclear.

21 Cuvigny (2010b): 255–256—inv. 1069.

22 *O. Petr.* nos. 228, 229 (Myos Hormos), 231 (Berenike); *IGRR* i. 1172; Sidebotham (1986): 84. See also *O. Ber.* 326—Ast and Bagnall (2016): 101.

23 Bagnall, Helms and Verhoogt (2005): 21–22; Bagnall and Ast (2016): 13; Sidebotham (2007a): 121; Sidebotham, Hense, and Nouwens (2008): 135; Sidebotham (2014): 620 (Philotera); *I. Pan.* 57 (Severus).

24 For the Jewish population of Alexandria see Fraser (1972): 55–57; Scheidel (2004): 1–31; Philo *Flaccus* 43.

25 *Corpus Inscriptionum Judaicarum* 1537, 1538. Weigall (1909): 163, says Dorion engaged in elephant hunting. However, Sidebotham (2011a): 42, notes the depiction was of an Indian and not an African elephant.

In the Roman period, the most prominent example of Jewish involvement in the Indian Ocean trade is the aforementioned Marcus Julius Alexander (whether he was practicing or not is unclear), but ostraka discovered at Berenike reveal the Semitic names of Rhobaos, Chennas, Abdoubas (possibly Abdoubastos), Netios, and Semanetos. Of course, a Semitic name is not necessarily an indicator of Jewish heritage, but it is a possibility.[26] Rhobaos seems to have given orders to those working at the customs gate, and so may have been part of the administration at Berenike, whereas Chennas was involved in loading goods onto a ship belonging to Varus.[27] It is unknown whether this meant that Chennas had charted space on this vessel to sell his own goods or whether he was acting as an agent or subordinate for someone else. In addition, at the port of Qanaʾ, a Greek graffito has been discovered that appears to have been written by a monotheist (possibly by someone Jewish or Christian, although not necessarily of Hellenic origin), in a structure that may later have been built over by a synagogue. Whether this individual was a trader or a missionary depends on the contested reconstruction of the text.[28]

A Jewish presence in the port of Myos Hormos may also be attestable. Excavators have tentatively identified an early first century CE building as a synagogue, because of its similarities to a temple but lack of offerings. It has also been suggested that its abandonment by the mid to late first century CE could be connected to wider unrest in Alexandria between the Greek and Jewish communities.[29] However, the material evidence testifying to a Jewish presence is fairly limited, and includes an Indian pot with a Semitic graffito (language not identified more precisely) written on it.[30] At Berenike two Greek jar labels—one mentioning Jewish delicacies, the other a label that can be simply translated as Jewish—have been identified, as has a sherd with Jewish Aramaic or Hebrew text on it which may conjecturally read as an order to let pass through customs.[31] A more general argument for the presence of Jewish communities in

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26 Possible Palmyrene script—*O. Ber.* 254–257. See also Sidebotham and Zych (2012a): 38, for an ambiguous wooden tag piece with Greek text on one side and some Semitic language on the other.

27 *O. Ber.* 36–49 (Rhobaos), 75 (Chennas), 183 (Abdoubas); Bagnall, Helms, and Verhoogt (2000b): 27, 45–50, 57; Bagnall, Helms and Verhoogt (2005): 11.

28 Sedov (2010a): 8; Sedov (2010b): 380; Vinogradov (2010): 389–392; Bowersock (2010): 393–396; Bukharin (2012b): 531–538; Seland (2014): 377.

29 Copeland et al. (2006): 125–127; Tomber (2016): 47. For the upheaval between the Greek and Jewish communities in Alexandria see Sly (1996): 167–180.

30 Copeland et al. (2006): 150—00780.

31 Steiner (2004): 277–281.

the area has been proposed by Cuvigny, who suggests that one of the Krokodilo ostraka (c. 108–115 CE) may make an implied reference to the Jewish revolt of 115–117 CE (in Egypt, Cyrenaica, and Cyprus). It refers to a Bassus who was fearful because of the current wars (πόλεμοι).[32] This, however, is tenuous at best. It is clear that some Jewish individuals were operating in the Red Sea at certain points in the Ptolemaic and Roman periods. However, the potential synagogue at Myos Hormos, the texts from Berenike, and the Krokodilo ostrakon are not yet sufficient to confirm the presence of a more permanent Jewish community.

The Eastern Mediterranean and Levant

The merchants and financiers of Egypt evidently played a predominant role in the conduct of Roman trade in the Indian Ocean, but this does not mean that other ethnic groups from the Empire were excluded. In the Ptolemaic period, Greeks outside Egypt certainly participated in the trade, as seen in the loan agreement for a venture to the Spice-Bearing Land. There is some indication that this may have been the case in the Roman period as well. An Egyptian amphora found at Qana' (Yemen) contains the Greek name Trokondas (in its genitive form, *Trokondou*), thought to indicate an origin in southern Asia Minor. However, this does not necessarily prove that Trokondas was involved in bringing this amphora to Qana'.[33]

The variety of scripts found at Berenike emphasise the cosmopolitan nature of the trade. Among these are Greek, Demotic, Egyptian hieroglyphs, Hebrew, Latin, Aramaic, Palmyrene, Hadramawti, and Indian scripts (Tamil-Brahmi, Prakrit, and Sanskrit).[34] In this context, it is quite interesting to note the partially legible inscription from Berenike set up by Marcus Rutilius Lupus, who describes himself as an interpreter and secretary (113–117 CE).[35] The Palmyrene merchants in particular become more noticeable in the Red Sea branch of the Indian Ocean trade during the course of the latter second and third centuries CE. An inscription from Koptos, dated to the latter second century CE, records the gratitude of a group of merchants and shipowners from Hadriane Palmyra to Zabdalas, son of Salmanos, a merchant of the Red Sea, because he had paid for the construction of a *propylaia* (gateway), three *stoae* (porticos), and *thuromata* (chambers) from his own funds.[36] This inscription reveals

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32 Cuvigny (2005): 159–160—K24.

33 Sedov (1996): 15.

34 Sidebotham (2007a): 164.

35 Bagnall, Helms and Verhoogt (2005): 27–28.

36 *I. Portes* 103; Young (2001): 80–81; Schörle (2017): 151–152. See also the Shrine of the Palmyrenes—Sidebotham (2014): 611–613.

the presence of a community of Palmyrene merchants at Koptos, and possibly, as Sidebotham suggests, a Palmyrene merchant headquarters.[37] In addition, a Greek and Palmyrene inscription at Dendera refers to a Julius Aurelius who was part of a community of merchants.[38]

The discovery of a wooden tablet with Palmyrene text in the Hoq Cave on the island of Socotra (a few hundred kilometres from the Horn of Africa) further strengthens the evidence for Palmyrene merchants trading via the Red Sea in the third century CE. A date of July, 258 CE has been proposed for this dedication on the basis of a textual reading. However, the radiocarbon dating of this wooden tablet suggests that it came from a tree that was cut down within the period 78–239 CE. If the textual date stands, it was written on wood obtained from a tree at least twenty years prior.[39] The use of the Red Sea route might also be inferred from the reference in an inscription concerning two Palmyrenes who were involved in a religious ceremony at Al Uqla, 15 kilometres away from Shabwa, the capital of Hadramawt, alongside two Chaldeans, two Indians and the king of Hadramawt.[40]

One of the factors that may have contributed to increased Palmyrene involvement in the Red Sea branch of the Indian Ocean trade during the latter second and early third centuries CE was the increased conflict between the Roman and the Persian (Parthian and Sasanian) empires, which appears to have impacted on their trade via the Persian Gulf (the main focus of Palmyrene commercial ventures).[41] Indeed, inscriptional evidence suggests that while Palmyrene activity via Mesopotamia and the Persian Gulf was quite significant during the reigns of Trajan and Hadrian, there is a notable absence of evidence during the period 161–193 CE. References to Charax cease in this period, although a journey to Vologaesias is recorded in the early third century CE.[42]

Another factor that may have encouraged some Palmyrene merchants to use the Red Sea route is the presence of Palmyrene soldiers (experts in desert

37 Sidebotham (1986): 95.

38 Sidebotham (1989): 497; McLaughlin (2010): 105; Schörle (2017): 152.

39 Gorea (2012): 452–453; Dridi (2012): 461–462.

40 Bron (1986): 95–98. These Palmyrenes were envoys, but trade interests almost certainly explain their presence—Seland (2016a): 79–81.

41 Healey (1996): 35–36; Young (2001): 151–154; Schörle (2017): 149–150. Seland (2016a): 78–79, is more sceptical.

42 Inv. III.29 = *CIS* II.3949; Gorea (2012b): 464–465; Young (2001): 173–175. However, Seland (2016a), 13–14, 38, has cautioned against seeing too strong a link between Palmyrene commercial activity and the levels of peace or conflict between the Roman and Parthian/Sasanian empires.

combat) in the region during the latter second and third centuries CE. Some of these soldiers were present at Berenike as shown by a dedication to Caracalla (September 8, 215 CE) erected by the auxiliary soldier Marcus Aurelius Mokimos. The site has also revealed a dedication to the Palmyrene god Yarhibol paralleling one found at Koptos, both probably dating around the late second to early third centuries CE.[43] It is possible that some merchants with familial or friendship connections to these soldiers decided to accompany them to Egypt and trade via the Red Sea, although, admittedly, this is only speculation.

The increased presence of Palmyrenes in the latter second and early third centuries CE seems to contrast with the limited evidence for their involvement in trade via the Red Sea during the first century CE. The name Hierabole (perhaps connected to the Palmyrene deity Yarhibol) appears on one of the Berenike ostraka, but besides this reference there is not much attestation. Even here, it is not clear if the individual is a merchant or someone engaged in another profession.[44] This dearth of evidence would seem to support the idea that periodic conflict between Rome and Persia during the second and third centuries CE encouraged a number of Palmyrenes to relocate their commercial activity to the Red Sea route.

Nabataeans were also active in the Eastern Desert and on the Red Sea coast. Most of the Nabataean graffiti in Egypt date to after the creation of the province of Arabia, and they are usually written by soldiers or individuals engaged in servicing caravans, although there are references to a plasterer and a patcher (perhaps of fabric).[45] One such graffito records the name Ausu, on a boulder 10.2 kilometres from Myos Hormos, in the 'usual formulary style of Nabataean caravaneers' wayside greetings.'[46] Nabataean graffiti appear on ceramics at Myos Hormos, including on a Nabataean cooking pot.[47] Interestingly, a few painted fine ware pottery sherds have been uncovered at both ports: in the case of Myos Hormos, they date from the late Augustan period to the second-third centuries CE, while at Berenike a few sherds dating to first century CE have also been uncovered. This suggests that Nabataeans were resident there and that some of them may have been traders. Durand has argued that some Nabataeans may have shifted their commercial interests to the Koptos-Myos

43 Alston (1995): 188; Alston (2007): 4; Verhoogt (1998): 193–198; Sidebotham (2011a): 63–66; Sidebotham (2014): 612–613; Sidebotham (2017b): 63–64.

44 *O. Ber.* 97; Bagnall, Helms, and Verhoogt (2000b): 27, 30, 65.

45 Sidebotham (1991): 32–33; Sidebotham (2011a): 154; Terpstra (2015): 85.

46 Bagnall et al. (1979): 245–246 (quote); Whitcomb (1979a): 63–64. See also Durand (2012): 85–86.

47 Copeland et al. (2006): 153—00795.

Hormos route with the decline of their caravan traffic overland through Arabia and the annexation of their territory into the Roman Empire. Nabataeans appear to be predominantly active on the Koptos-Myos Hormos route, rather than the Koptos-Berenike route (ὁδὸς Βερενίκης): only two graffiti have been identified in connection to the latter at Wadi Menih and Wadi Menih el-Heir.[48]

Italians and Merchants from the Western Empire

Even during the Ptolemaic period, Italian merchants had some connections with the Indian Ocean trade, as indicated by the Gnaius who acted as a financier for a trade venture to the Spice-Bearing Land.[49] De Romanis has also suggested that Italian involvement may be inferred from a dedication set up by a group of Italian merchants to Lachos (127/126 BCE), a Ptolemaic official who had interceded on their behalf with Ptolemy VIII and who later became *strategos* of the Thebaid (124–116 BCE). It is known from the inscription mentioning Sōterichos and Paōs (130 BCE) that this office was connected with the protection of Red Sea shipping and the caravans carrying aromatics across the Eastern Desert. Thus, De Romanis sees a connection between the Italians, Lachos, and commercial interests in the Red Sea.[50] This is a clever argument, and a distinct possibility. However, it should be acknowledged that there is no proof that Lachos had an interest in this region at the time these Italian merchants made their dedication (the dedication preceding the evidence for his administration of the Thebaid).

Whatever the degree of Italian involvement with the Indian Ocean trade during the Ptolemaic period, there is certainly evidence to suggest that by the Roman period an increased number of Latin speakers were present in Koptos, the Eastern Desert, and on the Red Sea coast. This is apparent from the presence of Latin graffiti in the Eastern Desert, although quite a few were written by soldiers based in the region.[51] For example, C. Papirius Aequus of the *III Cyrenaica* left a graffito at the *praesidium* of Phoinikon (al-Laqita) on the Koptos-Berenike route.[52]

48 Durand (2012): 87–88.

49 *SB* III 7169.

50 De Romanis cited in Brun (2006b): 189, n. 7; *ID* 1526 (Alexandrian inscription); *I.Philae* I 19, 8, 33 (Lachos as *Strategos*); *OGIS* 132 (inscription of Sōterichos).

51 See Alston (2007): 5–6; also Bagnall (1986): 8–9.

52 Sidebotham (1986): 55 (inscriptions in the Eastern Desert) *CIL* III 6628—Alston (1995): 194 (C. Papirius Aequus); see also Primus, slave of the Centurion Sextus Mevius Celeris—Meredith (1954).

People who left inscriptions or graffiti sometimes gave a full *tria nomina*, either in reference to themselves or to the person in whose interests they were acting. However, it should be borne in mind that the use of *tria nomina* is not necessarily an indicator of free Italian birth. The mixed Latin and Greek elements in several of the names mentioned in the Nikanor archive suggest Greek speakers who had received Roman citizenship, either as important *peregrini* or as former slaves to Roman citizens.[53] This ambiguity is apparent from the inscriptions of Gaius Numidius Eros, who left his name a few times at the cave of Wadi Menih.[54] This complication can also be seen with Severus, son of Moschion, a *naukleros* who left an inscription at the Paneion on the Edfu-Berenike route. He rendered his name in Latin, but his father's in Greek.[55]

It is not always easy to judge the status of these individuals, and whether they had been formerly servile. Since citizenship was granted widely in the East, especially during the reign of Claudius, there is no reason to assume that all those with mixed Latin and Greek names in their *tria nomina* were imperial freedmen or of servile origin.[56] Indeed, those that were Imperial freedmen or slaves are specifically mentioned as such in the Nikanor archive, as was the case with Anikētos Kommonos, a freedman of Tiberius.[57] The Imperial family had many estates in Egypt during the Julio-Claudian period, and it is reasonable to believe that some of these freedmen were individuals of eastern origin who managed imperial assets in Egypt.[58]

Ten or eleven of the Berenike customs passes (found during the 1994–1998 seasons) also reveal common Latin *praenomina*, such as Gaius, and common *gentilicia*, such as Arentinus.[59] The editors of these texts have suggested that several of these individuals were imperial freedmen, such as Gaius Julius Epaphroditus, a possible member of Augustus' household, and Tiberius Claudius Dorion and Claudius Philetos, possible freedmen of one of the Claudian emperors.[60] Philetos was engaged in the administration of customs rather than trad-

53 Alston (2007): 7.

54 Meredith (1953a); Sidebotham, Hense and Nouwens (2008): 192–193. Tchernia (2016): 46, suggests he was likely from a *gens* originating in Capua and, because his graffiti are only in Latin, he had little familiarity with Greek.

55 *I. Pan.* 57.

56 Tchernia (1995a): 148.

57 *O. Petr* 237–239, 242, 247.

58 See Shatzman (1975) for discussion of Imperial estates in Egypt.

59 Bagnall, Helms, and Verhoogt (2000b): 26.

60 *O. Ber.* 50–66 (Dorion), 80–85 (Epaphroditus), 89–92 (Philetos); Bagnall, Helms, and Verhoogt (2000b): 27.

ing, though Dorion appears to have been either an agent or procurer of goods for several different Graeco-Egyptian merchants. Epaphroditus seems to have been a merchant, as he was receiving goods for outfitting. Unlike in the Nikanor archive, none of these individuals is explicitly referred to as an imperial freedman, though Philetos may have been, given his role in customs collection. Curiously, one of the ostraka also mentions letting pass goods for Heroninos, the soldier of Claudius Dorion.[61] If these individuals can be equated with Imperial freedmen, they may have been trading on their own account for personal profit.

The Berenike customs passes mention individuals with a probable Italian or Western Mediterranean origin who clearly did participate in the Indian Ocean trade. These include Varus, Actiacus, and Quintus Arentinus Felix.[62] Likewise, the name Andouros appears several times, both in an administrative and a commercial context. It may be that there were at least two Andourii, one a merchant or agent, the other involved in the administration as a *quintanensis*.[63] It may also be the case that these Andourii were either Gallic, German, or from the Spanish city of Andura.[64] The Nikanor ostraka reveal maybe six or seven potential Italian merchants/agents (see above), but in five of these cases complete *tria nomina* are lacking.[65] A Greek letter from Berenike (on a fragmentary papyrus) records the names Antonius, Valerius and Lucius, while an inscription in the cave Wadi Menih refers to a Euphemos, slave of Lucius Atticus surnamed Felix.[66] The location of this inscription opens up the possibility that Euphemos acted as the agent of Lucius in trade.

As mentioned earlier, the comparative frequency with which merchants and agents of Italian or western Mediterranean origin appear in the Nikanor archive and Berenike customs passes is limited (less than 10 per cent in the ostraka of

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61 *O. Ber.* 50.

62 *O. Ber.* 56 (Arentius Felix); *O. Ber.* 111 (Actiacus); *O. Ber.* 68–73, 75–79 (Varus). Varus was quite probably an Italian shipowner, this would seem to be a logical interpretation from the ostraka. More opaquely an oracular ostrakon (c. 200 CE) from the fortlet Dios refers metaphorically to the sailor who wishes to save an Italian ship. Cuvigny suggests that this oracle may have been adapted to reflect local conditions—Cuvigny (2010b): 264, 270.

63 For reference to an Andouros as part of the commerce see *O. Ber* 11. The term *quintanensis* may refer to an official who received a specific type of tax levy, see Bagnall, Helms, and Verhoogt (2000b): 12; Bagnall, Helms, and Verhoogt (2005): 62–74; Sidebotham (2011a): 69.

64 Bagnall, Helms, and Verhoogt (2000b): 27; Bagnall, Helms and Verhoogt (2005): 11.

65 Cornelius (*O. Petr.* 246), Antonius Boreo … (254), Lucas (Loukios) Julius (261), Sabinus (281), and Longus (293). In the case of the other two (of the seven identified), Marcus Laelius (Lailios) Gmenaios and Aulus Cossitius Aktiacos, the latter may well be a Greek speaker who received Roman citizenship.

66 Bagnall, Helms, Verhoogt (2005): 43–45.

the 1994–1998 seasons). The ostraka from the 1999–2001 seasons at Berenike revealed a higher proportion of names. In this body of ostraka, some 30 Roman names appear (more than twice the amount from the earlier seasons) with largely Etruscan or Latin *gentilicia*. However, like the ostraka from the earlier seasons, many of these individuals, such Germanos, Caecilius, and Albius, all served in an official capacity as a *quintanensis*.[67] The sample of customs passes for the 2009–2013 seasons is probably too small to make any firm assertions.[68]

A number of scholars have suggested that Italian merchants and financiers played a prominent role in the conduct and expansion of Roman trade in the Indian Ocean. A major basis for this view is provided by the significant sums invested in this trade, coupled with the assertion that prominent Italian families were the ones providing this finance.[69] Tchernia has even specifically linked the export of silver *denarii* to India with the activities of Italian merchant families, one of the major arguments being that *denarii* did not circulate in Egypt.[70] This argument, however, is unconvincing. Firstly, the idea that Egypt had a closed currency system has recently been critiqued.[71] Secondly, it is not really clear why Graeco-Egyptian merchants would have been unable to get access to *denarii*. There were strong trading connections between the port of Alexandria and Puteoli (and later Ostia) in both the late Republican and Imperial periods, and, judging from the archive of the Sulpicii, Greek, or at least Hellenised merchants were very prominent in this commerce.[72] There is no reason to think that merchants from Alexandria could not have acquired *denarii* or *aurei* from Italian ports, or that these coins could not have been brought to Alexandria.

Interestingly, there is a fragmentary bilingual Latin and Greek inscription at Baraqish (in modern Yemen) which has been broadly dated between the first to fourth centuries CE. Reconstructing both the Greek and Latin elements, the name Publius Cornel[ius], along with the title *eques*, is recorded.[73] It is some-

67 Bagnall, Helms and Verhoogt (2005): 10; *O. Ber*. 137–139, 140a (Germanos), 140 (Caecilius, he is named alongside an Eponychos), 141 (Albius).

68 The texts on *O. Ber*. 481 and 482 are too fragmentary to be sure in what capacity Andouros was operating. But in the case of *O. Ber*. 488, Andouros appears to be operating in an administrative capacity. See Ast and Bagnall (2016): 180, 182.

69 Schörle (2015): 49.

70 Tchernia (1995b): 1004–1006.

71 See Bowman (2010): 106. Some *aurei* were minted in Alexandria in occasional circumstances—Bland (1996): 113; Carson (1990): 25.

72 For the archive of the Sulpicii see D. Jones (2006). Trade with Italy likely meant that large quantities of *denarii* and *aurei* could be brought back to Alexandria.

73 Costa (1977): 69–72.

times assumed that this represents a merchant, although this is not beyond doubt.[74] A number of scholars have connected several prominent Italian families to the Indian Ocean trade, including the Caii Norbani, Peticii, Auli Gabinii, Calpurnii, Anni, and Vestorii, arguing that these families (including their slave and freedmen agents) were operating in a form of vertical integration;[75] that is to say, these families were attested at various stages of the chain, from the acquisition of goods to their sale on the market.[76]

Perhaps the most prominent of these families are the Gabinii, whose line includes the notable Republican politician Aulus Gabinius, an associate of Pompey and the restorer of Ptolemy XII to the throne of Egypt. In the Nikanor archive, there is a reference to an Aulus Gabinius Agathopos who received drugs on the account of Aulus Gabinius Eudamionos at one of the Red Sea ports in 19 CE.[77] It is suggested by Alston that the Gabinii mentioned in the Nikanor archive must represent the continued Egyptian interests of the Gabinii family, whose famous Republican forbearer died in 48/47 BCE.[78] This is a possibility, but one that rests entirely upon assuming a connection due to a shared *praenomen* and *nomen*.

An individual called Norbanus appears twice in the Nikanor archive, operating on behalf of the freedwoman Isidora.[79] Rathbone has suggested that he was associated with Gaius Norbanus, who held land in the Hermopolite Nome; with Norbana Clara, who made payments to the *sitologos* in 65–66 CE; and with Norbanus Ptolemaios, who was a *dikaiodotos* and served as or for the *idios logos* in 63 CE. He further connects the Norbani of Egypt with the Norbani at Rome who were consuls in 38 BCE, 24 BCE, and 15 CE.[80] Again this is a possibility, but, as before, one that also rests solely on a shared *nomen*.

The Calpurnii family had commercial interests in the pearl trade and were operating at Naples, Puteoli, Rome, and possibly Ostia. Several Calpurnii also appear in Alexandria, Asia Minor, and Syria. Schörle argues that these connec-

74 Cimino (1994): 59.

75 Alston (2007): 7; see also Tchernia (1997a): 238; Tchernia (2016): 42–48; and Schörle (2015): 49–51.

76 A more technical definition being the 'mergers of different activities within a commercial *supply chain* or taking over different phases of the process of bringing goods from their point of origin … to the selling point.'—Schörle (2017): 148.

77 *O. Petr.* 225.

78 Alston (2007): 7. For aspects of Gabinus life see Cass. Dio 38.13, 39.55–63; see also Plut. *Vit. Pomp*. 25.2–3, 48.3; Joseph. *AJ* 14.55–57, 82–104.

79 *O. Petr.* 244, 257.

80 Rathbone (1983): 89; *P. Amh.* II 68; *P. Lond.* III 1213–1215; *P. Fouad* 21.

tions seem to provide clear attestation of the practice of vertical integration. In particular, a graffito by Laudanes, slave of Calpurnius Moschas, at the Paneion in Wadi Menih (Koptos-Berenike route) has been cited as evidence for involvement in the Indian Ocean trade, especially with regard to acquiring pearls for markets in the Mediterranean.[81] Similarly, Evers suggests that a Titus Vestorius Ialysos, who is also mentioned in a graffito at the Paneion in Wadi Menih, may be related to the Vestorii of Puteoli, whose business interests connected to the manufacture of blue dye.[82]

Tchernia has similarly argued that the Peticii, merchants who specialised in the wine trade during the late first century BCE to the first century CE, were exporting their products to places like India in return for high-value Eastern goods. He connects the Peticii family with the C. Peticius mentioned in a rock-cut dedicatory inscription to Dionysos that was written in both Greek and Latin in the Wadi Hammamat. Due to the absence of a *cognomen*, the assumption is that the date of the inscription is not likely to be later than the reign of Tiberius, and that his activities therefore overlap in time with the Peticii wine merchants of Italy.[83] This theory, while craftily constructed, relies on a hypothetical link between C. Peticius and the Italian wine merchants. The C. Peticius who left the inscription at Wadi Hammamat did not state his profession or purpose, and certainly does not reveal any detail about links to other Peticii from the Mediterranean.

Some have argued that the unnamed freedman of Annius Plocamus, who had been blown off course to Taprobane (Sri Lanka) while sailing around the southern Arabian coast, must have had commercial interests.[84] Whether this freedman was looking after his ex-master's commercial interests or his own is unclear, but some further postulate that this Annius Plocamus (who had obtained the right to collect the Red Sea duties) was connected to the influential Anni family of Puteoli.[85] It is quite likely that the Annius Plocamus mentioned by Pliny can be linked to two Greek and Latin graffiti written in the rock face at Wadi Menih (near al-Laqita). These were etched by a Lysas, slave of Annius Plocamus. However, given that there are a few decades between the graffiti, which date to 6 CE and the reign of Claudius (the setting of Pliny's account), it may in fact refer to an earlier member of the same family, possi-

81 Schörle (2015): 51–52. See also Tchernia (2016): 44–46.
82 Evers (2016): 118–121.
83 *CIL* III 1.29; Tchernia (1997a): 239, 241, 245–248; Tchernia (2016): 47–48, 220–228.
84 Pliny *NH* 6.24.84–85; see also Weerakkody (1997): 51–54; and Abeydeera (2009): 145–165.
85 Rathbone (1983): 88; Tchernia (1997a): 239.

bly suggesting a long-term family interest in the region.[86] Whether the Annius Plocamus referred to by Pliny and by Lysas can be linked to the Anni family of Puteoli is not beyond doubt, but it is certainly possible.[87]

When reviewing the proposed connections between these Italian families with large-scale commercial interests and their putative agents in Egypt, it appears that in most cases these links are plausible, but not beyond doubt. By contrast, evidence for investment by the political and social elite of Alexandria-Egypt—such as Aelia Isidora, Aelia Olympias, and Apollinarios the *eparchos*—appears more secure. This is not to dismiss the notion that wealthy Italian families had financial interests in this trade. Given the potential scale of the investments required for commercial ventures in the Indian Ocean and the potential profits that could be made, it is hardly surprising that many wealthy and influential individuals would invest.

There may also be some merit to the view that a number of these families engaged in vertical integration, although how common a practice this was is difficult to know. It is probably the case that a great many merchants and financiers wished to sell their goods (at auction) in the markets of Alexandria rather than maintain possession of them for sale in places like Rome. This is because by selling the goods in Alexandria, rather than waiting another few months to sell them in Rome (or other markets in the Mediterranean), the profit and capital required for reinvestment in the next season was more readily available. A circuitous exchange of goods between Alexandria and India was possible within a year's trading season. As will be seen in Chapter 4, this was less feasible between Italy and India. Most imported Indian Ocean goods could probably be sold for a higher price in Rome than in Alexandria. However, most of the markup would have been between their original purchase in the East and their arrival into the Roman Empire. Pliny claims that this markup could be as much as a hundredfold: this is likely a rhetorical exaggeration, but one that is generally reflective of the profits to be had.[88]

86 Meredith (1953a): 38–40, dates the Greek inscription to July 2, 6 CE (the Latin to July 5). De Romanis (1997b): 161–237, emends the Greek inscription to [ι̅]η̅ (numeral becomes 18 not 8), resulting in the Greek (18th of the Egyptian month Epeiph) and Latin (three days before the *nones* of July) dates corresponding. See more recently Tchernia (2016): 42–44.

87 For those supporting Tchernia's theory see Rathbone (1983): 88, 96; Whittaker (2004): 164; McLaughlin (2010): 159; Sidebotham (1986): 32–33, and Sidebotham (2011a): 72; Schörle (2015): 49–51.

88 Pliny *NH* 6.26.101.

The Scale of Investment

Whatever the extent to which financing was obtained from the Alexandrian elite, prominent Italian families, or other wealthy individuals from the Mediterranean world, it is clear that a substantial amount of capital was needed to purchase a vessel or charter space on one, secure supplies, pay wages, make repairs on route, and cover duties and taxes.[89] Those from the Mediterranean world who invested in the Indian Ocean trade have generally been characterised as among the wealthiest in Roman society, with "petty merchants" unable to participate due to a lack of resources.[90] Given the substantial sums mentioned in the Muziris Papyrus, this can be regarded as at least partially true. This document contains information both on its recto and verso. The recto represents either a loan taken out in Alexandria to fund a trading venture to Muziris, or a supplementary (or superseding) contract on return to one of the Red Sea ports. It outlines conditions about transport and repayment of the loan.[91] On the verso, details are recorded about a cargo aboard the Hermapollon, which was worth 1,151 talents and 5,852 *drachmae* after payment of tax, equivalent to just under 6,911,852 *sestertii*.[92] The amount of tax to pay at Alexandria was 25 per cent (the *tetarte*), the equivalent of 2,303,951 *sestertii*, making the total value of this cargo 9,215,803 *sestertii*.[93] The document is fragmentary, but the legible parts reveal details about a cargo comprising ivory, Gangetic nard, and *schida*.[94] However, De Romanis has attempted to piece together further details by examining surviving lettering on column I of the verso. He proposes that the ship's capacity was perhaps about 625 metric tonnes, of which the black pepper took up 544 metric tonnes of space.[95] The remaining cargo may

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89 D. Jones (2006): 176.

90 Casson (1989): 34–35; Casson (1991): 11; Rathbone (2000): 48–49 (prerogative of the wealthy); Whittaker (2004): 169–170 (petty traders lacked resources).

91 On this issue see Harrauer and Sijpesteijn (1985); Casson (1986) and (1990); Thür (1987); De Romanis (1996) and (2012b) and (2015b); Rathbone (2000); Morelli (2011).

92 *P. Vindob* G 40822 Verso, Column 2 lines 27–29; Casson (1990): 195; Alston (2007): 6; Rathbone (2000): 49.

93 Wilson (2015): 23.

94 On the identification of *schida* see Chapter 6.

95 De Romanis (2012b): 75–101. He proposes that the weight of pepper was about 544mt, or 87% of the total cargo space (c. 625mt). See also De Romanis (2015c): 369–370. *Contra* Morelli (2011): 222–228, who argues that the full consignment of goods on the Hermapollon was around 180mt of which pepper formed slightly less than 140mt (about three-quarters of the cargo).

have consisted of malabathrum and tortoiseshell (alongside the Gangetic nard, ivory, and *schida*).[96]

It is possible that the lender intended to purchase the goods himself, as the contract granted him the right to do so, and the fact that he had agents at several places along the route may suggest a regular involvement in the trade.[97] Rathbone has argued that such sums were typical because the Muziris Papyrus represents a copy of a standard contract, with the careless grammar and syntax and the general sloppiness of the document implying it was copied from a boilerplate.[98] It is quite possible that the Muziris Papyrus represents the format of a typical contract, but, in the absence of comparable documents, it is hard to be sure how much the sums mentioned reflect a "typical" cargo value.

There have been a few attempts to calculate the possible annual cost of Roman trade in the Indian Ocean on the basis of both the Muziris Papyrus and the statement of Strabo about 120 ships annually sailing from Myos Hormos (mid-20s BCE). Sidebotham took the value of the known cargo mentioned in the Muziris Papyrus, which weighed 3.18 metric tonnes or 3.5 short tonnes, and multiplied this by possible ship capacity (68 metric tonnes or 75 tonnes). He then multiplied this figure by the 120 ships mentioned by Strabo, estimating the cost of Roman imports at 17.64 billion Egyptian *drachmae* a year (equivalent to 17.64 billion *sestertii*).[99] This figure is rather extreme in light of estimates that put the total Roman GDP at around 9–20 billion *sestertii* per annum.[100] Indeed, one of the problems is that Sidebotham conflated the value of the three items definitively mentioned in the Muziris Papyrus with the total value of all the goods that would have been mentioned in the lacuna of the text (see above).[101] Others adopting similar approaches come up with a figure closer to one billion.[102] Such theoretical exercises can be useful for thinking about the potential scale of the trade and the investment required. However, it has to be

96 De Romanis (2012b): 89; De Romanis (2015b): 135–139.

97 Rathbone (2000): 42–43; Harris (2008b): 195 (lender purchase goods); van Minnen (2008): 237 (regular involvement).

98 Rathbone (2000): 41; also Temin (2004): 719–720; and McLaughlin (2014): 90.

99 Sidebotham (2011a): 217–218.

100 Scheidel and Friesen (2009); Cobb (2015a): 186.

101 The three items, Gangetic nard, ivory and *schida*, represent only 11.36 % of the total cargo value—De Romanis (2012): 77–78.

102 McLaughlin (2010): 161, employs a similar approach comes up with a figure of 1.08 billion *sestertii* a year; also McLaughlin (2014): 94. Likewise Wilson (2015): 23, suggests from the implied tax value in the Muziris Papyrus, timed by a theoretical 100 ships, Roman state revenue of 230 million *sestertii*—by extension valuing the trade at 920 million *sestertii*.

remembered that these are only reasoned suppositions, especially given the chronological gap between the ship figures that Strabo heard at Syene (c. mid-20s BCE) and the information from the Muziris Papyrus (mid-second century CE). As a result, caution is required when making comparisons, since the volume of Roman trade undoubtedly fluctuated between these two periods.

The Muziris Papyrus certainly indicates that significant profits could have been made, and the scale of initial investment in such ventures might also be guessed at from this document. Pliny's claim that goods were purchased in India and sold at a hundredfold their value in the Roman Empire may well be a rhetorical exaggeration, but something in the region of a tenfold profit is not unrealistic.[103] Hypothetically, on the basis of a hundredfold profit, the initial investment for the cargo of the Hermapollon would be about 92,000 *sestertii*, on the basis of a tenfold profit of about 922,000 *sestertii*.[104] Of course, as will be apparent from chapters 5 and 6, such hypothetical calculations do not take into account the fact that a significant portion of the trade would have been conducted through exchanging goods in kind, complicating any estimations of the initial "purchase" value of goods in India. Also, the profit margins on different types of goods would undoubtedly have varied, while factors such as fluctuations in supply would also have had an impact. It is likely that aromatics and spices could be purchased much more cheaply, and the profit margins were much greater than for items like pearls or precious stones (though statistical data is lacking).

In any case, these hypothetical calculations suggest that the initial investment for the cargo mentioned in the Muziris Papyrus would have been in the hundreds of thousands. This type of investment would have required the backing of members of the elite with substantial resources. It is, however, a mistake to characterise Roman participation in the Indian Ocean trade as solely financed by the super-wealthy (and operated by their agents). Even when looking at the Muziris Papyrus, it is clear that there is a hierarchy between the two participants named in the contract.[105] Since the goods were acting as collateral, the debtor himself may not have needed to possess a significant personal fortune. It is likely, though, that these individuals knew each other, or at least that the debtor was known to be trustworthy, otherwise such a substantial sum of money would not have been risked by the creditor.[106]

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103 Pliny *NH* 6.26.101. A ten to one profit ratio between Roman trade with Parthia and north-west India is claimed in the *Hou Hanshu* 88.12.

104 Valued at 9,215,803/100 = HS 92,158 *sestertii*. Valued at 9,215,803/10 = 921,508 *sestertii*.

105 Tomber (2008): 152; Young (2001): 57.

106 Temin (2004): 719–720; Temin (2006): 144.

It is also possible that groups of merchants operated in consortia, as was certainly the case in the Ptolemaic-period venture to the Spice-Bearing Land (*SB* III 7169). There may even be evidence that some of those lower down the social scale participated in some regard. For example, the soldier Gaius Julius, mentioned in one of the Berenike customs passes, acted as surety for a Graeco-Egyptian merchant.[107] It has also been suggested that the soldier Marcus Aurelius Mokimos must have played some part in commerce, as he was able to afford a dedicatory inscription; with the implication that other soldiers, by legitimate or corrupt means, may have commercial interests as well.[108] Soldiers erecting inscriptions, however, are not particularly unusual, and so it cannot be assumed with any certainty that Mokimos had any involvement in the trade.

The distinction between owning ships and needing to charter space also reflects the hierarchies involved in Roman participation in the Indian Ocean trade. The Varus who appears in the Berenike customs passes seems to own several ships. A number of different individuals were granted permission to load goods onto these vessels, and it is either the case that they were agents working for Varus (or other merchants) or that they had chartered space themselves.[109] It would have been a matter of economic sense to charter space out to less wealthy merchants as a means of spreading risk and raising capital.[110] In fact, this was extremely common practice in the Indian Ocean trade during the medieval period, and it was unusual for a ship to contain cargo owned or controlled by only one person.[111] This practice of chartering space is frequently referred to in the medieval Geniza documents.[112]

The evidence considered so far has shown the use of agents, partnerships, and loans for commercial purposes in Indian Ocean trade. The use of agents and dependants is frequently mentioned in the Nikanor archive, and this appears to conform to common business practice within the Roman Empire.[113] However, it may not always have been beneficial to have an agent operating on one's behalf, since it was impossible to guarantee that they would follow

107 *O. Ber.* 102.

108 McLaughlin (2010): 105–106; Sidebotham (2011a): 253; Sidebotham (2014): 613.

109 *O. Ber.* 68–79—including Pakoibis son of Maros, Peteasmephis son of Horos, Eponychos, Chennas, Tithoes son of Pakoibis.

110 McLaughlin (2010): 157, suggests the practice of investing in cargo spread across several vessels. A plausible idea, though one requiring many agents to oversee such operations.

111 H. Ray (2015): 184.

112 Goitein (1967): 263.

113 Morley (2007): 75.

their instructions, if any were stipulated. An account from the medieval Geniza documents reveals such problems with unsupervised agents or partnerships. Lebdi, the agent of Yekuthuel, was entrusted to exchange the goods in his care for lac (insect resin) in the Gujarat region of India. However, Ledbi disregarded these instructions and traded in different commodities and at different ports than Yekuthuel had stipulated. Some of the merchandise Ledbi sent back to Yekuthuel was lost at sea, and upon Ledbi's return to Egypt they were involved in a legal dispute about where financial responsibility lay.[114] There is a lack of evidence for such legal disputes in the Roman period, but it is interesting that the Muziris Papyrus reveals that the goods obtained by the debtor, which acted as the collateral, were kept under observation from the Red Sea to Alexandria. This included the items being placed under the seal of the creditor (or his agents).[115] If the creditor had intended to purchase the cargo, there might have been stipulations about the types of items to acquire at Muziris.

It was generally the case with maritime loans in the ancient world that if, as a result of shipwreck or piracy, a ship's cargo was lost, the borrower was freed from the obligation of repaying the loan. However, if the debtor did not make sufficient profit to repay the loan upon selling the cargo, the individual had to make up the shortfall from his own resources.[116] This may be the case with the Muziris Papyrus, where the security for the loan was provided by the goods themselves and not the ship (which may not have been the borrower's in any case).[117] Morley suggests that anyone wealthy enough to invest in the spice trade would probably only lose money if the ship sank.[118] There is no evidence from Roman times to substantiate this claim, but medieval evidence indicates that it was not always possible to sell Indian Ocean goods for reasons of oversupply or lack of quality. The Geniza documents mention one instance when some inferior black ginger could not be sold at Palermo and had to be sent on to another European country at a loss.[119] It is conceivable that merchants from

114 Goitein (1954): 192–195.

115 *P. Vindob* G 40822 Recto, Column 2 lines 1–26.

116 Andreau translated by Lloyd (1999): 54; D. Jones (2006): 180–184; Millett (1983): 36–37; in the case of the Muziris Papyrus the goods served as collateral—Casson (1986): 77–78; De Romanis (2014): 78.

117 *P. Vindob* G 40822 Recto, Column 2 lines 12–26. However, Evers (2016): 132–133, suggests that the lack of (surviving) terminology which is normally seen in a maritime loan contract may imply it was a "normal" loan.

118 Morley (2007): 31.

119 Goitein (1967): 45—Dropsie 389*v*, 1.6 ff.

the Roman Empire could also incur such a loss if they had made a bad purchase or had been tricked into buying inferior or fraudulent goods.[120]

There is also the question of whether merchant ships usually sailed individually or in groups. Meyer regards the text of the *Periplus* as being directed towards individual captains, rather than a fleet.[121] However, as noted in Chapter 1, it is not necessary to believe that the account of the *Periplus* reveals a typical voyage; rather, it is a collation of information gathered over many sailing seasons. Other ancient authors, such as Strabo, refer to fleets sailing to Arabia and India.[122] Such a practice may also be indicated by one papyrus (*P.CtYBR inv. 624*), which makes reference to a group of ships that had struggled to enter the harbour at Berenike after arriving very late at the port (June).[123] As will be outlined in Chapter 4, a July departure from the Red Sea ports was crucial for Roman merchants, making it likely that many ships will have set out together (or at approximately the same time), at least for the initial part of the outbound voyage.

In overview, it would seem that substantial sums were invested in the acquisition of goods, with clear evidence of financing coming from the Alexandrian political and social elite, and possibly also from some of the mercantile elites of Italy. Other groups from elsewhere in the Roman Empire, particularly Palmyrenes, appear to have participated in different periods. The use of agents by wealthy merchants or financiers to organise and supervise their interests is attested. It is possible that some wealthy mercantile families or partnerships were engaged in vertical integration, as has been suggested by Tchernia and Schörle for the Peticii and the Calpurnii. However, many merchants are likely to have obtained finance in Alexandria and, after successfully returning to the city and selling their goods, would probably have paid off their debts and then reinvested the money for next year's voyage. Such a model seems to be implied by the Muziris Papyrus. It is also possible that less-wealthy merchants were able to charter space from shipowners, something which may be suggested by references to the ships of Varus in some of the Berenike customs passes.

120 Book 37 of Pliny's *Natural History* is replete with references to fraudulent gemstones and how to spot them.

121 C. Meyer (1992): 53.

122 Strabo 17.1.13.

123 For *P.CtYBR inv. 624*—see Peppard (2009).

Ship Design and Construction

Just as the finances required by Roman merchants participating in the Indian Ocean trade were substantial, the vessels employed needed to be large, sturdy, and well built. The square-rigged merchant vessels used in the Mediterranean often ranged in capacity from several dozen to several hundred metric tonnes.[124] Casson asserts that the Roman vessels operating in the Indian Ocean would have to face the strong and often violent Southwest Monsoon winds, meaning that large and well-constructed vessels were required.[125] Some have questioned whether Mediterranean-style vessels were too rigid to suit the monsoon weather conditions, and suggested that the square-rigged sail was unsuitable.[126] However, more recently, it has been convincingly argued that square-rigged sail systems were more flexible than is sometimes assumed.[127]

Confirmation of the substantial size of some of these vessels can be found in the dimensions of the southern harbour at Berenike, which had a capacity to accommodate ships of up to 19–22 metres in width and up to 60–61 metres in length. These dimensions indicate ships that were short in comparison to their breath, making them harder to sail but less likely to capsize. Comparisons with shipping from the Mediterranean (commonly 70 to 180 metric tonnes / 75–200 tonnes) reveal that the ships operating from Berenike may well have been larger than average.[128] One reconstruction of the Muziris Papyrus puts the potential capacity of the Hermapollon at about 625 metric tonnes of cargo, although De Romanis notes that such large "pepper carriers" were not necessarily the norm.[129] Certainly ships capable of carrying around 600 metric tonnes would have been a very small minority among those operating, but ships of a few hundred tonnes capacity were probably more common.

Several literary texts indicate that some large ships were in operation. For example, one of the poems from the Sangam corpus refers to impressive Yavana (in this context, most likely Roman) vessels coming to exchange gold for pepper.[130] Similarly, a passage from Philostratus' *Life of Apollonius of Tyana* is suggestive of the comparatively large size of Roman vessels operating in the Indian

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124 Hopkins (1983): xvii. However, Wilson (2009): 229, notes the potential that small ships are over-represented in the shipwreck finds.

125 Casson (1984a): 476; Casson (1991): 10.

126 H. Ray (1994): 86; Ball (2000): 131–132.

127 Rougé (1988): 74; Whitewright (2007b): 83; Fauconnier (2012): 83.

128 Sidebotham (2011a): 195–196; also Strauss (2007): 100–102, 106–108.

129 De Romanis (2015b): 139.

130 *Akanananuru* 149.9. For the Sangam corpus and references to Yavanas see Chapter 5.

Ocean. The Indian sophist Iarchos gives a speech describing a hypothetical Egyptian ship that would sail in the Indian Ocean, speaking of it as many times larger than normal ships, with numerous cabins, armed men, and many captains and steersmen on board.[131] De Romanis argues that the reference to the ship's size and capacity in this passage is realistic, despite the mythological elements in it.[132] The description of the ship may well be exaggerated for literary effect, but the impression is essentially valid. Passage 56 of the *Periplus* (amended) makes reference to 'very big ships' sailing to Limyrikē.[133] There is good reason to assume the author of the *Periplus* is alluding to Roman vessels, for at the end of the passage he mentions that those sailing from Egypt set out in July, the Egyptian month Epeiph, and two passages earlier he mentions how the port's prosperity derived from the trade brought by Greek ships and those arriving from Ariakē (northwest India).[134]

It has been estimated that square-rigged ships of a hundred or so tonnes capacity required a minimum crew of around ten men in order to keep them operational. This figure does not include the carpenters, who were needed to repair parts of the ship.[135] The reference to armed men in the aforementioned passage from the *Life of Apollonius of Tyana* is supported by Pliny's reference to archers that were taken on board to offer protection against pirates, as well as references in the Koptos Tariff and Muziris Papyrus to the employment of private security.[136] Additional space will have been taken up by the merchants and travellers who chartered space on these ships. It is likely that many of the Roman vessels sailing in the Indian Ocean had at least a few dozen crew members, archers, and passengers sailing aboard (perhaps around 25–50 people, depending on the vessel).

131 Phil. *VA* 3.35.

132 De Romanis (2015b): 135.

133 *Periplus* 56; De Romanis (2015b): 134 n. 26.

134 *Periplus* 54, 56. For Ariakē see Casson (1989): 197.

135 C. Meyer (1992): 53, suggests at least ten crew members were needed; however, Whitewright (2008): 189, suggests about five crew members for a smallish vessel, with larger ships not needing significant increases in crew size.

136 Pliny *NH* 6.26.101; *P. Vindob* G 40822 Recto, Column 2 Line 2–4; *OGIS* 674; see also Phil. *VA* 3.35. Juvenal (6.153–157) implies this was a practice in the Mediterranean as well. See Sidebotham (1986): 70. McLaughlin (2014): 99, even implies that the vessels may have had towers manned by four fully-armed men and two archers, as well as wooden palisades. However, these claims are based on a description by Athenaeus (5.43) of the Syracusa of Hiero II (270–215 BCE), an exceptional ship that is hardly a model for later Roman merchantmen in the Indian Ocean, and a passage of Thucydides (7.25) relating to Athenian attempts to penetrate the Syracusan harbour.

Literary references relating to the types of vessels used by Roman merchants in the Indian Ocean are limited, but the archaeological and pictorial evidence reveal a similarity with the square-rigged merchantmen of the Mediterranean type. The author of the *Periplus* makes several allusions to foreign vessels, such as dugouts and sewn boats used by those sailing along the coast of East Africa, but he is less explicit about shipping from the Roman Empire.[137] Perhaps the author assumed his readers' complete familiarity with the vessels used, which could imply that they were not much different from the types used in the Mediterranean. That Roman merchants used vessels similar in construction to those employed in the Mediterranean seems to be corroborated by a pictorial graffito of a ship on two joining pottery sherds discovered at Berenike (dated by the surrounding stratigraphy to 50–70 CE). The sherds depict a large, square-rigged, ocean-going merchantman, which Sidebotham argues is similar to some depictions of Mediterranean vessels during the Principate.[138] Merchants from the Mediterranean world were not, however, the only ones to use one or more masts. The Satavanhana rulers would come to adopt the image of a ship with single or double masts on their lead coins.[139] More ambiguously, a graffito on a potsherd from Alagankulam (Tamil Nadu) dating to the first or second century CE has been interpreted as representing a typical two (or three-)masted vessel, either Roman or Indian.[140] Furthermore, a graffito from Khor Rori depicting a double-masted ship (second-third centuries CE), seemingly connected to whaling, is not entirely dissimilar to the other representations mentioned.[141]

In the Mediterranean, these types of vessels were constructed with a shell of planks, held together by thousands of closely set mortise and tenon joints, and sets of frames that were inserted afterwards—affording the ships great strength, but at the cost of speed.[142] Indeed, ships' timbers made of teak and cedar and joined with mortise-and-tenon joints have been found at Berenike, and similarly at Myos Hormos, with some of the tenons and pegs still intact.[143]

137 *Periplus* 15; Huntingford (1980): 158–159.

138 Sidebotham (1996b): 315–317; for images of Mediterranean vessels see Casson (1971): figs. 144–147, 149, 156; Whitewright (2008): 263–314.

139 H. Ray (1994): 32–33.

140 Tchernia (2011): 83–88.

141 Autiero (2015): 117; Avanzini (2015): 189–190. See also a double-masted Satavahana ship on a seal (second century CE) from Pargadas (Bengal).

142 Casson (1991): 10; see also Strauss (2007): 88–100.

143 Sidebotham (2011a): 197; Sidebotham and Zych (2012b): 147–151 (Berenike); Blue (2009): 6

It should not really be surprising that merchants from the Roman Empire stuck with a familiar shipping tradition.

The archaeological evidence from Myos Hormos and Berenike appears to further confirm the use of the square-rigged merchantman. At Berenike, the excavators noted the presence of sail fragments, one with a brail ring attached, and the use of reinforcing strips typically represented on depictions of Roman merchant vessels (they are absent in Indian representations). This find has a parallel in a reused sail employed as packing in a mummified burial at Thebes (first century BCE).[144] Many brail rings were discovered at Berenike in the early Roman deposits, while 169 brail rings, a deadeye, various sheaves from rigging blocks, and several fragments of sailcloth have been discovered at Myos Hormos. These are all typical components of a Mediterranean vessel.[145] The deadeye (from a mid to late second century CE context) found at Myos Hormos would have been used for rigging and is comparable to examples from Grado (northern Adriatic), Laurons (southern France), and Nin (Croatia). The sheaves from rigging blocks, distinctly Mediterranean in style, were used for a vessel's running rigging, and are comparable to an example from Caesarea Maritima.[146] Also, at Myos Hormos, deposits of nails and tacking made of iron and copper have been found in Roman levels, as have scraps of lead sheeting with holes. It is believed that these were to sheath the hull of a merchant vessel, as was common Graeco-Roman practice.[147] Likewise, evidence of sheathing, as well as the use of resin, is apparent from the remains at Berenike.[148] This material evidence is supported by a fragmentary Greek papyrus, which records either a ship's manifest of equipment or a list of needed items. Either way, it includes references to braces, pulleys, mast belts, branding irons, bundles of papyrus rope, and gum (possibly).[149] In its totality, all this evidence strongly points to the use of Mediterranean style merchantmen by Romans traders operating in the Indian Ocean.

The issue of where the ships were constructed is more complex, but the evidence suggests that hulls were assembled at the Red Sea ports, or possibly just

(Myos Hormos). See also Sidebotham and Zych (2010): 21; Zieliński (2011): 60, 63; Zych et al. (2016): 328–329.

144 Wild and Wild (2001): 215–216.

145 Sidebotham (2007a): 45 (Berenike); Whitcomb, (1979b): 203; Whitewright (2007b): 283, 287; Whitewright (2008): 246–251 (Myos Hormos).

146 Whitewright (2007b): 283–285; Whitewright (2008): 82–83.

147 Peacock et al. (2006b): 80.

148 Sidebotham and Zych (2010): 21; Sidebotham and Zych (2012a): 33.

149 Bagnall, Helms and Verhoogt (2005): 45–47.

at Myos Hormos, while other components were brought overland from Koptos.[150] The latter practice is confirmed by the Koptos Tariff, which records the tolls paid both by shipbuilders' servants and artisans who crossed the Eastern Desert, as well as on components that were transported across, such as masts and yardarms.[151] Since dragging a hull across the Eastern Desert would be a rather difficult task, it makes sense that these would be constructed at the ports themselves. This idea seems to be corroborated by an ostrakon from Krokodilo, which records a wagon with timber for shipbuilding being sent to Myos Hormos, and is strengthened by the fact that Myos Hormos (and Berenike) possessed the woodworking and metal industries necessary for ship construction and repair.[152] Historical parallels for such activities can be seen in the Pharaonic-period ship construction at Wadi Gawasis, in a cave near the Red Sea.[153]

There were other potential means by which ships could be brought to the Red Sea. Plutarch claims that Cleopatra dragged her fleet between the Mediterranean and the Red Sea (presumably to the Suez region). However, the first ships that arrived were burnt by the Nabataeans, and the plan was subsequently abandoned.[154] It is not clear how feasible this would have been with merchant vessels as opposed to warships, and the account suggests it was an unusual practice, driven by necessity. Alternatively, medieval accounts refer to ships being disassembled on the Nile, transported over the Eastern Desert, and then reassembled; whether this could have been done in the Roman period is open to question.[155]

Some have proposed that vessels from the Mediterranean reached the Red Sea via the Nile and Trajan's Canal (Amnis Traianus). Alternatively, it has been suggested that ship materials were sent down the canal in order to construct

150 Bülow-Jacobsen (2013): 567, infers that the absence of references to wagons on ostraka found along the Koptos to Berenike route, and at the port itself, may imply that wagons with timber were only sent to Myos Hormos, and hence this port was where shipbuilding primarily took place.

151 *OGIS* 674.

152 Bülow-Jacobsen (2006b): 408, 420—*O. Krok.* 41. Artorius Priscillus, the Prefect of Berenike, forbid the waggoneers from attempting to sell the wood destined for shipbuilding while travelling along the route to Myos Hormos. For wood working and metal industries at Berenike see Hense (2000): 191; Vermeeren (2000): 342. For Myos Hormos see Blue (2006): 59; Peacock et al. (2006b): 78–80, 94.

153 Sidebotham (2008): 309.

154 Plut. *Vit. Ant.* 69.2–3.

155 Whitcomb and Johnson (1979a): 3; Peacock and Blue (2006a): 4.

vessels at Clysma.[156] The former theory seems impractical, and both lack any supporting evidence. It has even been proposed that some ships were constructed in India by either Roman or Indian craftsmen, but in the style of Mediterranean merchantmen. This is based on the fact that foreign materials were sometimes used in the structure and components of vessels, including teak planks and Indian-spun cotton sails.[157] This is a possibility, but it is equally likely that these elements reflect repairs made to Roman merchantmen at foreign ports. Mediterranean woods were used in shipbuilding, as can be seen from the recycled Lebanese cedar and carob wood timbers at the Red Sea ports.[158]

It is clear that vessels sailing in the Indian Ocean needed to be frequently repaired, especially Roman merchant ships sailing during the Southwest Monsoon season (more ferocious than the Northwest Monsoon). Attempting a return journey to Egypt without having repaired the ship first would be foolhardy.[159] It is logical to assume that many of the ship components made of foreign material found in the Red Sea ports are either the result of Roman ships making repairs in overseas ports, or discarded components of foreign ships that had come to the Red Sea. These may be the most likely explanations for the discovery of reinforcing strips for sails at Berenike. Examples include pieces of linen webbing sewn onto a medium weight s/s flax tabby (following native Egyptian sewing traditions), as well as pieces of cotton webbing sewn onto a z/z (Indian) cotton tabby.[160] The use of recycled wooden planks in the walls of buildings at Berenike, both cedar (from the early Roman period) and teak (from the late Roman period), is also indicative of discarded material from ship repairs.[161]

156 Huntingford (1980): 5 (whole ships); Sidebotham (2008): 308–309; Sidebotham (2011a): 201; Fauconnier (2012): 81–82 (components).

157 Blue (2009): 9–10.

158 Sidebotham and Zych (2010): 21; Sidebotham and Zych (2012b): 147–151; Sidebotham (2015a): 8. Clearly good quality Mediterranean timber was imported into Egypt for the purpose of ship construction. See Fauconnier (2012): 79–80, on the limited supply of Egyptian sources of decent hardwood.

159 Wild and Wild (2001): 219; Strauss (2007): 253. There is possible evidence for the (re)painting of ship hulls for waterproofing at Berenike—Zych et al. (2016): 329–330.

160 Wild and Wild (2001): 214; F. Wild (2004): 61–63. For Roman linen ship sails, see Pliny *NH* 19.2.7–16.

161 Vermeeren (1998): 341–343; Vermeeren (1999): 119–202; Sidebotham (2008): 310; Sidebotham (2014): 611, 616; Sidebotham (2017b): 67; Van der Veen (2011): 223–224; Tripati et al. (2016): 1264.

Other possible examples of the use of foreign materials in Roman ship construction come from the 169 brail rings found at Myos Hormos. Examination by the excavators revealed that 118 were made from cattle horn and 51 from wood, with one of these wooden brail rings being attached to what was probably a piece of sailcloth (found in a first-century to early second-century CE *sebakh*). Some of the wooden brail rings analysed appear to be made from blackwood (*dalbergia sp.*), which grows in India and Ethiopia but not in the Mediterranean, while the cattle horn was probably derived from cattle slaughtered in Egypt.[162] All this points to individuals with the requisite skills being important members of a ship's crew, as seems to be clear from the Koptos Tariff.[163]

Summary

Identifying the ethnicity and status of those from the Roman world involved in the Indian Ocean trade is fraught with difficulties. Nevertheless, the available evidence would suggest that Graeco-Egyptian merchants continued to be heavily involved in the organisation and operation of this trade in the Roman period. This was not to the exclusion of others, as is apparent, for example, from the involvement of Palmyrene merchants in the latter second and third centuries CE. Some Italian involvement is also apparent, and a number of scholars have proposed theories that link several prominent families to the Indian Ocean trade. However, it should be acknowledged that these mostly rely upon assuming a connection between individuals due to shared *praenomen* and *nomen*.

The Muziris Papyrus certainly indicates that substantial profits could be made from the Indian Ocean trade, and this text, along with the comments of Pliny, suggests that initial investments may have been on the order of several tens or hundreds of thousands of *sestertii*. Some members of the elite invested in this trade, and many of the more powerful financiers and merchants seem to have had agents working on their behalf. However, it is clear that the trade was not entirely conducted by the agents of the super wealthy. Merchants who did not possess all the capital required to fund their commercial ventures could obtain loans.

162 Whitewright (2007b): 287–289; Whitewright (2008): 246–250.

163 Craftsmen resident at the major ports may have also been able to help with repairs as was typical with later European shipping in the Indian Ocean—see Scammell (1996): 30.

The types of ships being employed by Roman merchants in the Indian Ocean were similar in design to those used in the Mediterranean, but were, on average, quite large and likely had a capacity of a few hundred metric tonnes or more. This clearly left a lot of space for goods in kind to be transported in the hulls, and it is likely that many shipowners chartered out space in their vessels to other merchants so as to spread risk and acquire funds. The Berenike customs passes possibly indicate that this was the strategy used by Varus, who owned several vessels. It is also clear that craftsmen were an important part of the crew, since they were needed to repair the ships that had been damaged while sailing in the Indian Ocean.

CHAPTER 4

The Roman State and the Indian Ocean Trade

The Ptolemaic government devoted a significant amount of resources and attention to the Eastern Desert and Red Sea regions. Over time, the Roman state also expended much effort in the maintaining and developing of a series of *praesidia* (fortlets), *hydreumata* and *lakkoi* (wells and cisterns), and *skopeloi* (towers) lining the routes between the Nile and the Red Sea coast.[1] Manned by the Roman military, they were necessary for storing water, protecting the merchants traversing the Eastern Desert, and preventing smuggling. By providing access to water for merchants at set distances, it reduced the amount pack animals needed to carry, meaning they could be loaded with more goods.[2] While acknowledging the benefits provided by these facilities, some scholars, such as Young, have argued that the Roman state was primarily concerned with ensuring tax revenue from the trade and preventing smuggling, the security role being subordinate to these concerns.[3] However, new evidence, particularly ostraka from the *praesidia*, shows that this view needs to be revised. It seems that security was, in fact, becoming a major issue by the latter half of the first and the beginning of the second centuries CE. This occurrence can be linked to periods of intense (re)construction of the *praesidia*, which feeds into a broader debate about the peak period of Roman involvement in the Indian Ocean trade.[4]

In addition to the important role the Roman state played in ensuring the safe transport of goods across the Eastern Desert, its interests were not solely confined to ensuring the payment of the *tetarte* levied at Alexandria. It also had broader diplomatic and strategic interests in the Eastern Desert and Red Sea regions, which, in part, were connected to the Indian Ocean trade. The extent to which Rome's military and diplomatic policy was directed towards advancing commercial interests has proved quite contentious. It is argued in this chapter that some theories go beyond what the evidence can support. This

1 For this terminology see Bagnall, Bülow-Jacobsen and Cuvigny (2001): 330; Cuvigny (2006b): 267–273; Cuvigny (2006c): 306–307, 353–357.

2 Wilson (2015): 17. For 240 ostraka relating to the importance of the Roman military in the supply of fresh water to Berenike (first century CE) see Sidebotham and Zych (2010): 11; Sidebotham and Zych (2012b): 136, 138; Tomber (2016): 44; Ast and Bagnall (2016): 29–30, 71–163.

3 Young (2001): 69–74.

4 See Chapter 9.

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is not to deny that Roman state policy may have been beneficial to merchants—naval forces in the Red Sea in all likelihood helped combat piracy—but only emphasises that the limits of the evidence make it difficult to identify a coherent "policy approach".

The question of whether the Imperial family or the Roman state had direct commercial interests in the Indian Ocean trade, beyond merely deriving tax revenue, is also addressed in this chapter. Sidebotham argued in support of this idea several decades ago, particularly on the basis of imperial slaves and freedmen who appear in the Nikanor archive.[5] His arguments have since generated both criticism and support.[6] It is argued in this chapter that the possibility should not be dismissed, but that the evidence for this is far from concrete. That some Imperial freedmen operating in the Eastern Desert and Red Sea had their own commercial interests is a speculative idea, which is tentatively considered here.

Facilitating the Trade

Numerous stations or fortlets (*praesidia*) were established on the routes connecting the Nile Valley with the Red Sea ports during Ptolemaic and Roman times. In the Roman period the fortlets running along Koptos-Myos Hormos route normally had curtain walls and ramparts (at least from the Flavian period, if not earlier). The largest of them possessed circular or semi-circular towers, although some of these towers were square in later phases of occupation, such as at Bir al-Hammamat.[7] Most are now in an advanced state of ruin (exceptions include al-Zarqa/Maximianon).[8] The fortlet of Didymoi (Khashm al-Menih) on the Koptos-Berenike route (ὁδὸς Βερενίκης) also shows similar features, and is comparable to Maximianon in its layout.[9] These fortlets usually lay on the wadi floor and contained internal cisterns (*lakkoi*) or wells (*hydreumata*) to store and provide water to travellers and occupants. Some wells were stone-lined to protect against pollution and allowed deeper access to the ground water. Along the Koptos-Berenike route, there is even evidence of artificial

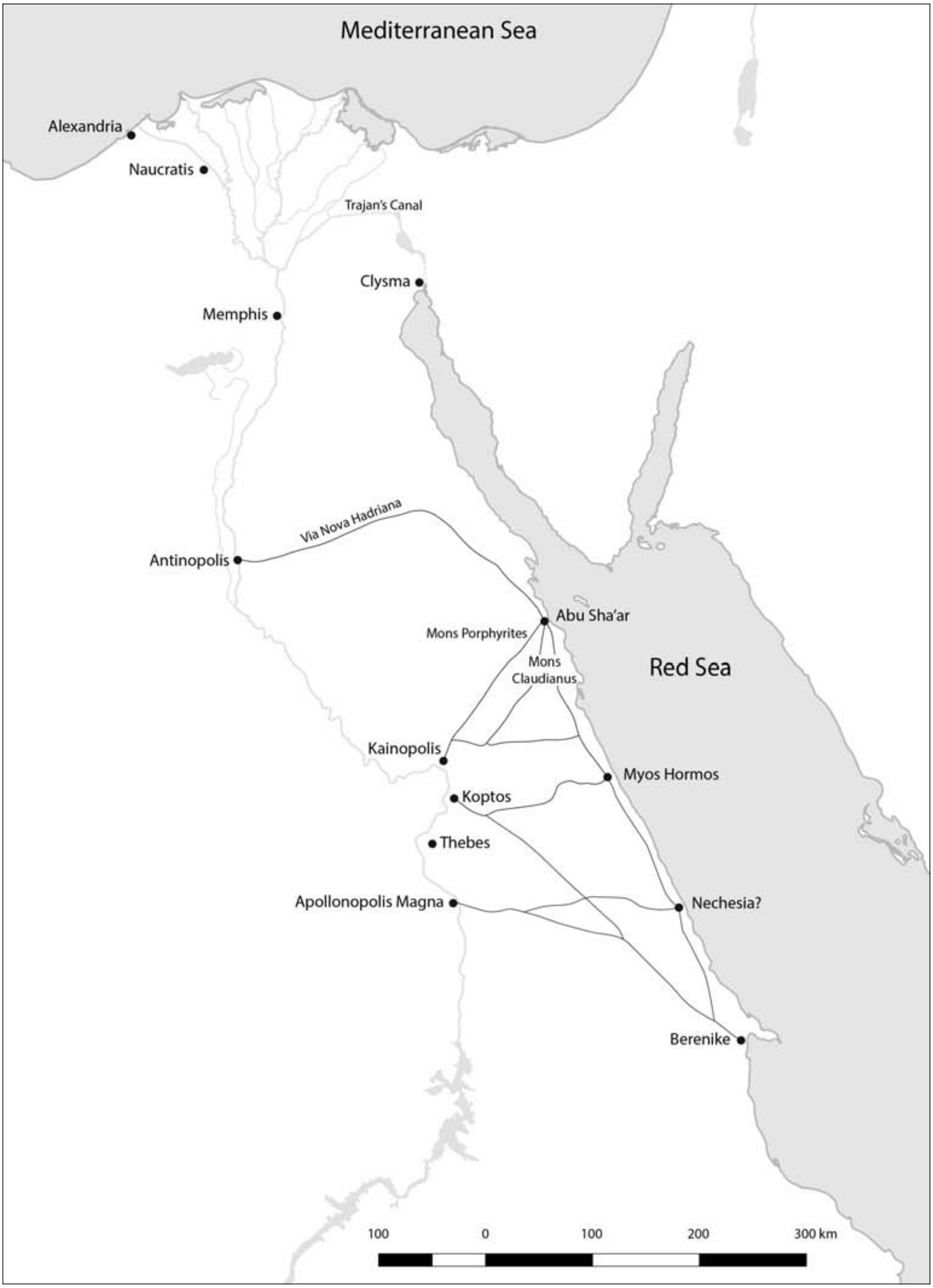
5 Sidebotham (1986).

6 Criticism—Casson (1989); Young (2001); support—Bowman (2010).

7 Prickett (1979): 304–305; Zitterkopf and Sidebotham (1989): 167; Reddé and Brun (2006): 73–74 (Quseir al-Banat), 77–91 (Krokodilo), 91–94 (Bir al-Hammamat), 100–101 (Maximianon).

8 Reddé and Brun (2006): 73–185; Zitterkopf and Sidebotham (1989): 166–167. The walls on each side of Maximianon (al-Zarqa) are about 59–60 metres in length—Brun (1996): 686.

9 Brun and Reddé (2011b): 17–19.



MAP 3 *Egypt and the Eastern Desert*

channels that diverted rainwater from nearby elevations to be stored in cisterns.[10] Capacities for cisterns ranged from 39,000 litres (Rod Umm Farraj) to 200,000 litres (al-Muwayh, the *praesidium* known as Krokodilo).[11]

In some instances large cisterns supplied water to small extramural tanks. The most likely purpose was to supply passing pack animals, a common feature on the routes leading from ancient Kainopolis (Qena) to the quarries at Mons Claudianus and Mons Porphyrites but also seen on the more southerly routes leading to the Red Sea ports. Examples of this include Abu Greiya (the *praesidium* known as Vetus Hydreuma) and al-Zarqa (the *praesidium* known as Maximianon).[12] However, it tended to be more common along the Koptos-Myos Hormos and Koptos-Berenike routes for pack animals to be brought inside the fortlets. Indeed, Reddé and Brun note that free space was available in the interior of Dawwi for the reception of camels and horses.[13] This practice made sense for travellers needing a place to rest, as the Krokodilo ostraka make it abundantly clear that security was a potential issue. One ostrakon refers to the "barbarians" (*barbaroi*) stealing animals.[14] A large collection of ostraka, discovered principally during the 2009 excavation season at Berenike, also highlights the important role the Roman military played in the supervision and storage of water supplies at the Red Sea ports.[15]

The amount of space available within the fortlets varied, and Cuvigny estimates that those along the Koptos-Myos Hormos route could hold anywhere between 38 people (Dawwi) to 116 people (Krokodilo). This is assuming an average of 9 to 10 square metres of space per person. Consequently, space was available for civilians and pack animals, as the number of soldiers occupying these fortlets was less than the total available space. The ostrakon M920 lists duty rosters for Maximianon (incomplete), Persou, and Simiou (complete). For Maximianon 15 names survive, 18 at Persou, and 15 at Simiou. Other lists mention duties assigned to individuals and groups of two to four men on alternating days, which, on the basis of these texts, makes the size of an average garrison

10 Sidebotham, Hense, and Nouwens (2008): 310, 314; Zitterkopf and Sidebotham (1989): 163, 167–168. See also Jackson (2002): 100 (Myos Hormos route); Wright (2003): 229–230; Brun and Reddé (2011a): 9–13 (Berenike route).

11 Sidebotham, Hense, and Nouwens (2008): 88–89, 310–319, 322–326.

12 Reddé and Brun (2006): 103–104 (Maximianon); Sidebotham, Hense, and Nouwens (2008): 317 (Abu Greiya).

13 Reddé and Brun (2006): 134–135. For camels permitted to pass through the Eastern Desert see *O. Ber.* 150, 151.

14 Cuvigny (2005): 36—K534.

15 Ast and Bagnall (2011): 78; Ast and Bagnall (2016): 29–30, 71–163.

TABLE 1 *Koptos-Myos Hormos route*

Station	Distance from Koptos
Matula	17 km
al-Laqita (Phoinikon)	34 km
Quseir al-Banat	50 km
al-Muwayh (Krokodilo)	65 km
Bir al-Hammamat	81 km
Quarry at Wadi al-Hammamat (Persou I)	84 km
Fawakhir (Persou II)	89 km
al-Zarqa (Maximianon)	109 km
al-Hamra	121 km
Bir Sayyala (Simiou?)	141 km
Dawwi	154 km
Bir al-Nakhil	160 km
The port of Myos Hormos	173 km

between 15 and 24 soldiers during the early second century. One ostrakon from Krokodilo implies that there were no more than eight cavalrymen at Krokodilo, while another indicates that just three cavalrymen were assigned to postal service for a particular month.[16] These men occupied the fortlets all year round, as an order recorded on the so-called "Amphora of the Barbarians" reveals. In the order given by the prefect Arruntius, it is stated that *curatores* (supervisors) of the fortlets on the Myos Hormos route should not abandon their posts, except under explicit authorisation or force majeure.[17]

Large groups of travellers and their pack animals probably confined themselves to short rests and revictuallisation at the fortlets. There is no precise evidence for how large some of these commercial caravans could have been, but it is not difficult to imagine that the larger groups were unable to fully accommodate themselves in the stations (a point that shall be returned to later). Space was also taken up by a (semi-)permanent civilian population, including women

16 Cuvigny (2006c): 307–310—K242; *O. Krok.* 1. Broux (2017): 138, suggests a garrison size of about 15–20 men at Didymoi. For a list of the stations see Table 1.

17 Cuvigny (2005): 149—K3 + K5 + K214—lines 1–14; Cuvigny (2014): 168. On the length of time in which soldiers may be assigned to some of these *praesidia* see Broux (2017): 138.

FIGURE 3 *Entrance way to Maximianon*

FIGURE 4 *Interior of Maximianon 1*

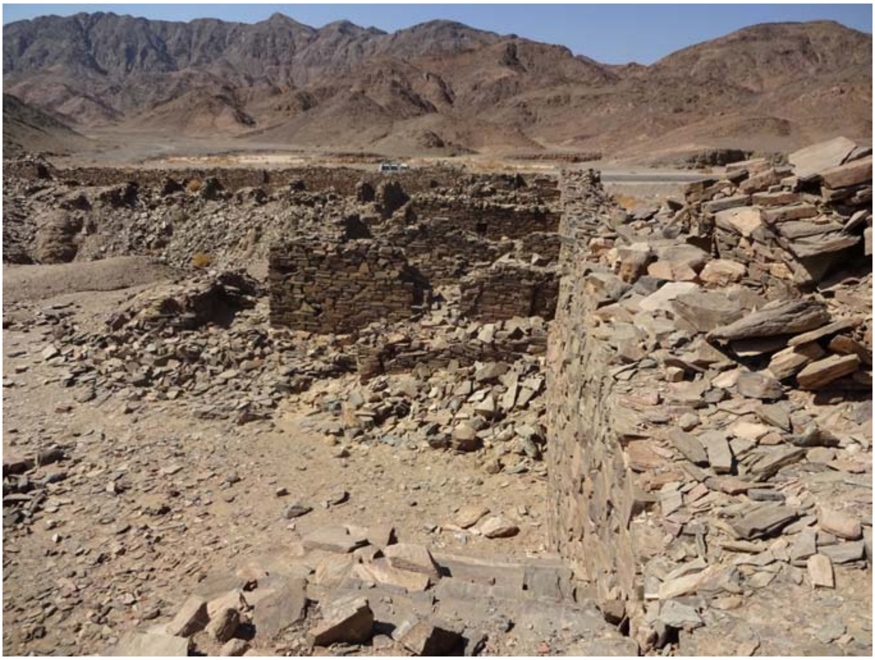


FIGURE 5 *Interior of Maximianon 2*

FIGURE 6 *Interior of Maximianon 3*

FIGURE 7 *Steps to rampart in Maximianon*

and children, as revealed by necklace components and garments for children. More explicitly, ostraka from Krokodilo, Maximianon, and Didymoi mention family members of soldiers and civilians (prostitutes were also present).[18]

These stations were reliant upon receiving supplies like cereals, pulses, certain fruits, and wines from Koptos, although partial use was made of local resources.[19] Most of the wine came from the Thebes-Koptos region, but with rare imports of Cilician, Cretan, and Gallic wine. The remains of fruit stones (especially dates), onion, and leek fibres emphasise the point that the occupants' diet was not solely based on cereals, as do the remains of Red Sea fish, with those fortlets closest to the coast showing a higher proportion in their assemblages.[20] While official army supplies were composed of grain, many

18 Brun (2006d): 520 (necklace); Cardon (2006): 639 (textile fragments); Cuvigny (2006d): 362–364, 395; Broux (2017): 139–145 (ostraka).

19 Cappers (1999): 190; Bülow-Jacobsen (2003): 54; *O. Krok* 605, 703; *O. Petr*. 245.

20 Brun (2006c): 503–508 (amphorae); Brun (2006a): 61 (organic remains). For the transport of Aminaean grapes (grown in Egypt) see *O. Ber*. 209; for cabbage—*O. Ber*. 210. Leguilloux (2006): 563—fish bones made up 21.4% of faunal corpus in the rubbish-dump of Maximianon (60 km from the coast), but only 6.5% at Krokodilo (111 km from the coast).

fruits and vegetables seem to have been acquired via private transactions.[21] A limited degree of self-sufficiency was attempted with small-scale agriculture (kitchen gardens) in the vicinity of the fortlets, and the raising of pigs and poultry.[22] By and large, the diet of those residing at the desert forts was probably quite good. But this is not to say that occasional instances of shortages are not recorded. One ostrakon from Maximianon relates that Herennius (at Simiou) asked his brother Lucretius to send him green fodder for his horse, who had gone without for five days, while another mentions a decurion, Manilius Felix, who wrote to Novellus, *curator* of Maximianon, to send water by wagon to his station due to a shortage in supply.[23]

The Koptos-Myos Hormos route had the greatest concentration of fortlets, with one roughly every 16 to 18 kilometres, compared to 30 to 40 kilometres for the Koptos-Berenike route.[24] The literary sources do not provide a list of the stations for the former route, though ostraka from Krokodilo and Maximianon record several names.[25] As can be seen from Table 1, there is a greater concentration of stations the closer one gets to Myos Hormos, probably as a result of the increasingly mountainous terrain to the east.[26]

By contrast, the textual evidence and *itineraria* represent eight to ten *praesidia* or *hydreumata* lining the Koptos-Berenike route, although the accounts do not always tally. Pliny's *Natural History* (6.26.102–103), the Antonine Itinerary and the Peutinger Table indicate that the distance between Koptos and Berenike was 257–258 Roman miles (roughly 380 km). Pliny mentions only eight stations, and does not always record the distances between them. In contrast, the Antonine Itinerary and the Peutinger Table both reveal ten, but only

21 On this see Broux (2017); *O. Ber.* 471, 472, 474—Ast and Bagnall (2016): 173–176.

22 For examples of kitchen gardens see Fawakhir—Reddé and Brun (2006): 98; Persou II—Bülow-Jacobsen (2003): 55; for raising swine and poultry—Krokodilo—Brun (2006a): 65, Reddé and Brun (2006): 87. More generally see Cappers (1999): 191–196; Cappers (2006): 15–20, 45–48; Kryzwinski (2007): 45–58.

23 Bülow-Jacobsen (2006b): 405–406; *O. Max* 147 (Herennius) *O. Max* 689 (Manilius Felix). See also the request by the *epimelētēs hydreumaton* at Dios for tools and men to re-excavate a dried up well—Cuvigny (2014): 177–178. In addition, one ostracon from Krokodilo records an appeal for bread from a neighbouring station—*O. Krok.* 585—Broux (2017): 138.

24 Zitterkopf and Sidebotham (1989): 169; Sidebotham, Hense, and Nouwens (2008): 90–91. For a table of major Ptolemaic and Roman period fortlets/stopping points in the Eastern Desert see Sidebotham (2011a): 129–135.

25 A site called Siaroi is mentioned in one ostrakon, but its location is unknown—Bülow-Jacobsen (2006a): 54–55; *O.Max* 639.

26 Zitterkopf and Sidebotham (1989): 181. See also Map 3.

TABLE 2 *Koptos-Berenike route*

Stations	Pliny *NH* 6.26.102–103	Antonine itinerary	Peutinger table
Hydreuma	22 (Roman) miles		
Phoinikon		*Poenicon* 24 (Roman) miles	*Phenice*
"A second Hydreuma"	Reached after a day		
Didymoi (Khashm al-Menih)		*Didime* 48 miles	*Afrodites*
Aphrodito (Wadi Menih el-Heir)		*Afridito* 68 miles	*Dydimos*
Compasi (Bi'r Daghbag?)		*Compasi* 90 miles	*Conpasin*
"A third Hydreuma"	95 miles		
Jovis		*Iovis* 113 miles	*Dius*
Aristonis (Wadi Gerf)		*Aristonis* 138 miles	*Xeron*
Falacro (al-Dweig?)		*Falacro* 163 miles	*Philacon*
Apollonos (Wadi Gemal)	184 miles	*Apollonos* 186 miles	*Apollonios*
"Another Hydreuma on a mountain"	?		
Calbasi (Wadi Ghusan)		*Calabasi* 213 miles	*Cabau*
A "New Hydreuma" next to a "Vetus Hydreuma" (Wadi Abu Greiya)	230 miles		
"The last station"	237 miles		
Possibly Vetus Hydreuma—Sidebotham (1986): 60–61			
Cenon Hydreuma		240 miles	
The port of Berenike	257 miles	258 miles	

the former provides distances. The Antonine Itinerary has Didymoi as the second station along the route and Aphrodito (Wadi Menih el-Heir) the third, while the Peutinger Table reverses this order.[27]

Archaeological survey has revealed another station along the Koptos-Berenike road at Rod al-Buram, between Bezah and Gerf. However, Rod al-Buram has revealed mostly late Classical and early Hellenistic pottery.[28] A number of these stops have revealed Flavian-period foundation dedications, while a well

27 Sidebotham (1986): 60–61; Parry (1999): 187–188; Wright (2003): 226–227; Bülow-Jacobsen (2006a): 52; Jackson (2002): 106—all provide lists of references and tables from the literary sources. See Table 2. Additionally, see Cuvigny (2011b): 5–7.

28 Sidebotham (1999c): 364.

at al-Laqita (Phoinikon) has revealed a dedication to Pan dating to the reign of Claudius; however, 'Vu les circonstances de la découverte, rien ne prouve *a priori* que cette dédicace à Pan soit en relation avec le puits dans lequel elle a été trouvée.'[29]

Sidebotham suggests that some of the discrepancies in the three accounts may be due to the fact that later wells were dug after Pliny's time, and that some of the earlier sites had ceased to function when the Antonine Itinerary (c. third century CE) and Peutinger Table (c. fourth century CE) were originally composed. He also suggests that Pliny made use of earlier sources of information, possibly the map of Marcus Agrippa, and thereby may have omitted stations that existed by the early Flavian period.[30] This theory is possible, but speculative, and it cannot be ruled out that his list does reflect the situation around the late Julio-Claudian or early Flavian period. It is a matter of debate as to whether these itineraries and maps were connected to "official mapping" by the Roman government or ideological projections of power.[31]

Dating the Stations

Until recently, many scholars regarded the Julio-Claudian period as ushering in a major phase of construction and repair of the *praesidia* (fortlets), *hydreumata* (wells) and *lakkoi* (cisterns) in the Eastern Desert.[32] Part of the reason for this assumption is that many of the graffiti along the Koptos-Myos Hormos route date to the Julio-Claudian period, particularly the reign of Tiberius.[33] Also, earlier surface surveys had revealed sherds only roughly assigned to the first or second centuries CE.[34] However, recent archaeological work on the Koptos-Myos Hormos route indicates that this view needs to be modified, since most

29 A. Bernand (1972): 37–38; see also Brun (2006b): 191; Cuvigny (2006b): 275; Reddé (2006a): 41–42.

30 Sidebotham (1986): 61 (discrepancies); Sidebotham (2011a): 158 (Pliny using earlier information). For Xeron, the earliest attestation is 96 CE, while Didymoi was founded in 76/77 CE—Cuvigny (2014): 168.

31 On the Antonine Itinerary and Peutinger Table see Whittaker (2004): 78–81. For the view that the Peutinger Table was produced by a 'recognised authority' for propagandist purposes see Talbert (2010): 142–157; although on the difficulties of identifying a/the maker(s) or commissioner(s) see 133–136.

32 For example Peacock (2000): 426; Sidebotham (1986): 54; Van der Veen (2011): 8.

33 A. Bernand (1972): 15; Young (2001): 41; *I Koptos* 3, 38–39 (Augustus); 40–49 (Tiberius); 1 (Claudius); 50 (Nero); 51 (Titus); 52–53 (Domitian); 4–5, 54–55 (Hadrian); 56 (Antoninus); 57 (Maximinus Thrax).

34 Sidebotham (1986): 64; Zitterkopf and Sidebotham (1989): 165.

of the written evidence and material remains at these sites date from the Flavian period onwards.[35] The stations on the Koptos-Berenike route also show significant building activity during the Flavian period. An inscription at Siket describes how, in the ninth year of Vespasian (76/77 CE), the prefect of Egypt, Iulius Ursus, ordered the construction of a well; this inscription parallels almost word for word another found at Aphrodito (*I.Pan* 68), which, despite a lacuna for the date, is probably related to the same period.[36] An inscription from the *praesidium* of Didymoi likewise reveals a foundation date around 76/77 CE, with a second inscription revealing the addition of a large cistern (alongside the two pre-existing ones) on the orders of the prefect of Egypt Mettius Rufus (89–92 CE).[37]

With regard to the Koptos-Berenike route, Pliny indicates that eight of the stations were in use by at least the Julio-Claudian or the very early Flavian period. The major phase of (re)construction in the Flavian period may indicate an increased level of activity, concerns about security, or a combination of the two, but it does not negate the significance of the routes in the Julio-Claudian period, as the Nikanor archive makes clear. Indeed, earlier materials appear in the detritus of fortlets like Krokodilo (Neronian billion coins) and Maximianon (small bronze Ptolemaic coins, c. first century BCE; a fragment of a Hellenistic horn lamp; and a bronze coin of Claudius).[38] In addition, the largest and westernmost of the fortlets in the area of Wadi Abu Greiya (Vetus Hydreuma) shows modifications from an earlier Ptolemaic plan, with the change from circular to rectilinear fortification.[39]

There is certainly some basis for believing that this major phase of (re)construction was due to the increasing threat posed by the indigenous population of the Eastern Desert. There are ten or so reports from the Krokodilo ostraka (Trajanic-Hadrianic in date) recording warnings about “barbarian attacks” on travellers and the fortlets. Brun proposes that the Julio-Claudian period was more peaceful, citing the lack of ramparts at the fortlets of the Wadi al-Hammamat and Zarqa as evidence. Strabo’s remarks (late first century BCE) that nomadic attacks were less of a concern in the Augustan period, as well as the

35 Reddé and Brun (2006): 86, 90–91, 94, 98–99, 126, 137; Brun (2006b): 187, 199, 200–201.

36 Cuvigny (2006c): 356.

37 *I. Did.* 1; *I. Did.* 2; Bagnall, Bülow-Jacobsen and Cuvigny (2001): 328–329; Bagnall, Helms and Verhoogt (2005): 23; Brun (2006b): 197; Brun (2011a): 115–123; Brun, Cuvigny and Reddé (2011): 157–163; Cuvigny (2012b): 39–42.

38 Reddé and Brun (2006): 88, 90 (Krokodilo), 112–113 (Maximianon).

39 Bülow-Jacobsen (2006a): 56; Agatharchides 5.41b = Diod. Sic. 3.18.3–6; Sidebotham (2011a): 31.

increasing use of camels, making raids easier, have also been cited in support of this view.[40] Possible heightened tensions may also be suggested by a papyrus fragment, which mentions a mid to late first century CE (c. 60–94 CE) clash between Roman forces and the Ethiopians and Trogodytes.[41] Thompson suggests that the latter should be equated with the Blemmyes, but, given that the text mentions the skirmishes taking place in the Eastern Desert, it clearly refers to the local nomadic inhabitants.[42]

Cuvigny further advances this view of a comparatively more peaceable Julio-Claudian period by pointing to an inscription (two of six slabs surviving) commemorating the work of Roman military personnel, who, in the course of some months, constructed *lakkoi* at Apollonos Hydreuma, Compasi, and Berenike, while also building a camp at Myos Hormos. These slabs record the soldiers' names and the centuries and cohorts to which they belonged.[43] She argues that since the inscription (which she regards as early Julio-Claudian) refers to the creation of *lakkoi* rather than *praesidia* in the Eastern Desert, it shows that unfortified cisterns were all that was required in this earlier period. However, it should be noted that attempts to date this inscription, particularly on the basis of onomastics, have produced conflicting results. Since new citizens often took the *gentilicium* of the reigning emperor or of the magistrate who granted them citizenship, Alston felt that the presence of a soldier called P. Flavius, son of P, must indicate a Flavian date, while Syme argued that the presence of two Lollii, both from Ancyra, shows that these men were enlisted when M. Lollius was legate of Galatia in 25–22 BCE.[44] This method is far from satisfactory, but arguably a Flavian date seems the more likely given the Flavian-era work at sites like Didymoi and Aphrodito, which, like Compasi and Apollonis, are on the Koptos-Berenike route. In addition, most of the archaeological material found at these sites dates from the Flavian period onwards.[45]

One of the primary (although not exclusive) factors behind this increased security concern was the high volume of commercial traffic in the latter first century CE (see Chapter 9). However, it is probably a mistake to see the Julio-

40 Brun (2006b): 196; Cuvigny (2014): 182–184; Strabo 17.1.53; see also Murray and Warmington (1967): 29.

41 E. Turner (1950)—Papyrus 40 'della raccolta Milanese (Collezioni del Castello di Milano)'.

42 Thompson (1969): 43; See E. Turner (1950): 57–59—restoration as τρωγοδύτης.

43 *ILS* 2483 = *CIL* III 6627; Cuvigny (2006b): 267–273; see also Cuvigny (2006c): 353–357. For discussion of this inscription see Kennedy (1985): 156–157; Young (2001): 44; Alston (1995): 30; Syme (1995): 249; Bohec (2000): 77; Wilson (2015): 20.

44 Syme (1995): 249; Alston (1995): 30 (*contra* Alston (2007): 3).

45 See also Sidebotham (2011a): 154.

Claudian period as entirely free from strife. Security in the Eastern Desert was certainly an issue during the Ptolemaic era, as evidenced by the fortified gold mining settlements and the fortlets along the routes from Edfu (Apollonopolis Magna). In addition, eleven dedications from the Paneion (el-Kanais), including by Ptolemaic soldiers, record the thanks given for being spared from the attacks of the Trog(l)odytes.[46] The stopping points (*masiones*) mentioned by Pliny on the Koptos-Berenike route are probable continuations of the στρατόπεδα that Strabo states were established by Ptolemy II. Indeed, it is hard to believe that the fortification of all the *masiones* is entirely the result of less than decade's worth of Flavian rule.[47] Some stations actually show continuity between the Ptolemaic and Roman periods, such as Bir Sayyala, suggesting that the routes were not completely unfortified prior to the Flavian period.

Skopeloi

Besides the fortlets, with their internal wells and cisterns, a series of towers called *skopeloi* were built in the Eastern Desert. One survey records at least 65 on the Koptos-Myos Hormos route; by comparison, very few have been found on the Koptos-Berenike route.[48] Since the Koptos-Myos Hormos route was shorter, it would have been more suitable for the setting up of a series of inter-visible watchtowers. Typically, these towers were built of dry stone and measured about three metres high and three metres square, with rubble-filled interiors. The better-surviving ones reveal platforms bordered by small parapets. They were built both on the roadside and on the surrounding hills, the distance between them varying from a few hundred metres to as much as five kilometres, depending on the terrain.[49] Recent examination has shown that two towers in the Wadi al-Hammamat sector were built with clay mortar, and their dates are 'postérieures à la diffusion de la céramique italique' (first quarter of the first century CE).[50]

It is usually assumed that the intervisibility of the towers was to facilitate communication independent of the fortlets. This idea is given credibility by a

46 A. Bernand (1972): nos. 3, 13, 18, 43, 44, 61, 62, 82, 90; Mairs (2011): 159–160.

47 Pliny *NH* 6.26.102–103; Sidebotham (2011a): 158; Bagnall, Helms and Verhoogt (2005): 24. As noted above, Pliny's list may have been based on the Map of Marcus Agrippa.

48 Zitterkopf and Sidebotham (1989): 160; Sidebotham, Hense, and Nouwens (2008): 87.

49 For these towers see Peacock et al. (2006a): 8; Prickett (1979): 319; Zitterkopf and Sidebotham (1989): 181; Brun, Cuvigny, and Reddé (2006): 207.

50 Brun, Cuvigny, and Reddé (2006): 208–209.

similar system of communication towers found in the region of the Mons Claudianus quarries.[51] Most likely these towers communicated the arrival of ships and warned of bandit attacks.[52] Ostraka recording the posting of men refer to rotations of two to four individuals. The two men at the top of the tower were likely the signallers, while the two men at the bottom probably investigated activity in the area.[53] Bagnall suggested that they were manned by local Egyptian villagers under a *dekarias*, since the names of those stationing the towers were Egyptian. But this seems doubtful, especially at those towers furthest from the Nile Valley.[54]

Ostraka from Krokodilo and Maximianon reveal a postal communication system employing cavalrymen, who travelled between the fortlets on the Koptos-Myos Hormos route. It probably took an average of two to three hours to deliver a message from one fortlet to the next. It may have taken around 24 hours to send a written message on horseback from Koptos to Myos Hormos.[55] The towers may therefore have provided a more rapid, albeit simpler, form of communication through signalling, although there concurrent use is by no means certain, nor it is clear how frequently they were manned.

Administration and Security

In addition to constructing, repairing, and manning the fortlets on the Eastern Desert routes, the Roman military also administered the region. The highest authority was the *Praefectus Montis Berenicidis* or *Praefectus praesidiorum et Montis Berenicidis*, whose title was often abbreviated to Prefect of Berenike or Prefect of the Desert.[56] A dedicatory inscription from Aphrodito reveals that the Prefect of Berenike was directly responsible to the Prefect of Egypt.[57] This office came with the duties of suppressing brigandage and smuggling, protect-

51 Zitterkopf and Sidebotham (1989): 186; Peacock (1997): 254–255; Peacock et al. (2006a): 9. *Contra* Bülow-Jacobsen (2013): 568, who asserts that their function is unresolved, and that they may well post-date the *praesidia*. He also suggests that the lack of ceramics surrounding them implies that they were not regularly manned.

52 Zitterkopf and Sidebotham (1989): 186–187; Maxfield (1996): 15.

53 Sidebotham (1986): 64; Zitterkopf and Sidebotham (1989): 183; Bagnall and Sheridan (1994): 166–167; Young (2001): 70; *O. Amst* 8–14.

54 Bagnall (1976): 26; Bagnall (1977): 71–77; *contra* Peacock et al. (2006a): 11.

55 Cuvigny (2005): 6.

56 Cuvigny (2006c): 295–297.

57 Sidebotham (1986): 67—*I. Pan* 68.

ing travellers, and undertaking constructions and repairs. The total area of the "Desert of Berenike" is not known precisely, but a reading of the Koptos Tariff would suggest it ranged from the Nile to the Red Sea coast (although probably not extending as far north as the quarries at Mons Porphyrites and Mons Claudianus). The prefect could travel about, as one ostrakon shows him sending letters from the fortlet of Persou.[58] Sidebotham suggests that the prefect would normally be based at Berenike.[59] However, it is clear that these officials spent at least some of their time at Koptos. Indeed, one of the prefects, Aemilus Celer, served as a commander of a cavalry *ala* at Koptos. In addition, a communication sent by the prefect Artorinus Priscillus mentions his desire for some donkeys to be escorted from Myos Hormos back to him at Koptos. It would certainly have been easier to communicate with both Myos Hormos and Berenike while based at Koptos.[60]

The earliest Roman reference to the administration of the region comes from an inscription of 11 CE referring to P. Iuventius Rufus as the *eparchos* of Berenike.[61] The first Latin attestation of the office of prefect dates to the reign of Tiberius where there is mention of an L. Pinarius Natta as *Praefecto Berenicidis*.[62] A reference to a Nome of Berenike in one papyrus (132 CE) had previously led some to assume that responsibility for the region had shifted to a civilian office by the reign of Hadrian.[63] However, a variety of evidence shows the continuation of the prefecture throughout the second century CE, including an inscription from Didymoi that records Claudius Lucilianus as Prefect of Berenike in 190 CE.[64]

Besides the post of Prefect of Berenike, the ostraka from Krokodilo also reveal the military hierarchy within the Eastern Desert. Circulating letters were often addressed in the following manner: from the prefect to the centurions, decurions, *duplicarii*, *sesquiplicarii* and the *curatores* of the *praesidia* of the desert.[65] This seems to indicate an order of seniority, but interestingly, when

58 *O.Krok* 47; Cuvigny (2006c): 295–300; Maxfield (2001): 143–170.

59 There is certainly a fragmentary inscription at Berenike (first/second century CE) recording a dedication by the '... prefect of the garrisons and of Berenike ...'—trans. from Bagnall, Helms and Verhoogt (2005): 28–29.

60 Sidebotham (1986): 53; Sidebotham (2011a): 140; Cuvigny (2006c): 297—*O.Did* inv. 733 (Aemilus Celer); Cuvigny (2005):—K315 (Artorinus Priscillus).

61 Meredith (1952): 106; Maxfield (2001): 147; SB 10, 173 = *SEG* XX 670 = *I.Pan* 51.

62 Cuvigny (2006c): 302; *CIL* X 1129 = *ILS* 2698.

63 *P. Hamburg* 7; Sidebotham (1986): 102–103; Young (2001): 75.

64 Cuvigny (2006c): 304; *I.Did.* inv. 940; *P.Bas.* 2, 7–8.

65 See for example Cuvigny (2005): 136—K3 + K5 + K214—lines 63–72; Cuvigny (2006c): 338.

the *curatores* wrote reports, they addressed them directly to the Prefect and not to any under-officers or subordinates. In contrast, no *curator* is addressed directly by the prefect in any of the surviving documents. The office of *curator* was not strictly a military rank, but rather an appointment to command a *praesidium*. *Curatores* had to fulfil several main functions, including managing supplies, protecting travellers and their goods, conveying messages relayed to them, and guarding the water supply.[66]

The Roman Military and the Indigenous Population of the Eastern Desert

It was undoubtedly the case that the Roman state was interested in overseeing the routes running between Koptos and the Red Sea ports to prevent smuggling and to monitor travellers. However, a number of ostraka unearthed in the past few decades also make it abundantly clear that soldiers played a vital role in protecting travellers from potentially threatening indigenous nomads. These peoples are known from ethnographic descriptions in Graeco-Roman literature, as well as through other written sources (inscriptions, papyri, ostraka) and archaeological material.[67] Unfortunately, they do not leave any of their own written testimony. They were often referred to as Trogodytes (*Trogodytai*/*Trogodytae*) and the wide geographic space they inhabited as Trogodytika.[68] Strabo notes that, living ten to twelve days from the Nile, their territory spanned the strip of land from the Suez as far south as Meroe and Ptolemais.[69] The term *barbaroi* (barbarians) was also used by the author of the *Periplus* to refer sweepingly to peoples living within this area, and it likewise appears in the Krokodilo ostraka. Obviously these peoples were not one homogenous group, a fact acknowledged in some sources, which often subdivided groups within these areas by their supposed eating habits. Among these were the so-called *Ichthyophagoi* (Fish-eaters), *Agriophagoi* (Wild Animal-eaters), *Moschophagoi* (Shoot-eaters), *Rhizophagoi* (Root-eaters), and *Cynamolgoi* (Dog-milkers).[70] Pliny also provides names of some of these groups,

66 Cuvigny (2005): 143; Cuvigny (2006c): 314–316, 321.

67 See Barnard and Duistermaat (2012).

68 See Strabo 16.4.4–5; Pliny *NH* 6.33–34.163–176. On whether these people were referred to as *Trogodytae* or *Troglodytae*, see Murray and Warmington (1967): 24–33; Cuvigny (2006c): 347.

69 Strabo 2.5.36, 16.4.4, 17.1.25–30, 17.2.2; Pierce (2007): 41–42.

70 *Periplus* 2; Agatharchides 5.30–49.

including the Autaei, Gebadaei, and the Asarri, who, living between Arsinoe (Clysma) and Myos Hormos, had intermarried with the Trogodytes.[71]

The Krokodilo ostraka (c. 102/103 to 118 CE) make it quite clear that *barbaroi* attacks were a real concern to the authorities. One ostrakon (108 CE) records the theft of several camels by 18 barbarians, and further provides the detail that a pursuing cavalryman, Lucretius Priscus, was injured or killed. Another damaged report informs personnel at the fortlets to be on guard after an incident involving the barbarians.[72] Most spectacularly, news of an attack by 60 barbarians against the *praesidium* of Patkoua (probably situated not too far away from the ὁδὸς Μυσορμιτική) was reported to those stationed in the fortlets on the Myos Hormos route, presumably because this news was deemed relevant to them. This account mentions the death of one infantryman and possibly a horseman, the abduction of a woman and two children, and the death of another child.[73] The Krokodilo ostraka reveal several other examples besides these.[74] One ostrakon from the *praesidium* at Dios also records a warning from Apollonios to Melanas to wait for two days before going out to collect wood, in order to receive fresh news about the *barbaroi*.[75]

Of course, not all indigenous peoples were hostile, as an ostrakon from Myos Hormos demonstrates. In this document an individual called Pukubis, who is referred to as an *Ichthyophagos*, asks permission to move his fishing vessels from Myos Hormos to the more northerly Philoteras.[76] An ostrakon from Xeron also refers to potential minor commercial transactions between the *barbaroi* and those at this station.[77] It should be noted that not all threats stemmed from the local population of the Eastern Desert. Bandits from the Nile Valley also caused problems after abandoning villages in greater numbers as a result of various factors, including unrest, the Antonine Plague, and increased eco-

71 Pliny *NH* 6.33.167–168. The term *Arabes* is found in a few of the ostraka from Mons Claudianus, but is otherwise rare in connection to the Eastern Desert—Cuvigny (2014): 169–171.

72 Cuvigny (2005): 36—K534—*O. Krok.* 6 (108 CE) raid by barbarians; 96—K694 (be on guard). See also Cuvigny (2006c): 351–352, for ostraka mentioning nomadic attacks (or fear of them) at Mons Claudianus (180s CE).

73 *O. Krok* 87; Cuvigny (2005): 135–145—K3 + K5 + K214; Cuvigny (2006c): 337.

74 See Cuvigny (2005): 135–158; also Table 3.

75 *O. Dios* inv. 687 (second century CE)—Cuvigny (2014): 178. See also *O. Did.* 27, for reference to the *barbaroi* (c. second quarter of the second century CE).

76 Thomas (2007): 151, 158—Ostrakon 0512. See also the Greek *dipinto* an Egyptian amphora from Myos Hormos which mentions an individual designated as a Trogodytes—Cuvigny (2014): 171.

77 Cuvigny (2014): 178–179, 185–188—*O. Xer.* Inv. 465 (c. 115–130 CE).

nomic difficulties during the late second and third centuries CE.[78] Nevertheless, significant acts of aggression between the Roman military and the indigenous nomads were a feature of the late first and early second centuries CE.[79] The late-first-century CE campaign against the Ethiopians and Trogodytes has been noted. This can also be seen from a Hadrianic period dedication (in Greek and Latin) set up by Sulpicius Serenus, who may be Servius Sulpicius Serenus, tribune of the *Legio XXII* and prefect of the *Ala Voconces*. In this inscription Serenus celebrates his speedy victory over the infamous *Agriophagoi*, their massacre, and the seizing of camels and booty. This reference to booty led Cuvigny to suggest Serenus' actions were part of a retaliatory attack.[80] However, there is nothing to preclude this act of aggression being planned and unprovoked.

Providing Security and Escorts

With the potential for violent encounters, it is not surprising that many merchants crossing between Koptos and the Red Sea ports required protection. There are several references in the Krokodilo ostraka to cavalrymen from the fortlets on the Koptos-Myos Hormos route acting as escorts for merchants, transporters of supplies, and military officials.[81] It is not clear how frequently these escorts were provided, but the fact that they were often authorised by the Prefect of Berenike (or a deputy) could imply they were not always granted. In addition, these escorts usually consisted of only one or two cavalrymen. This seems odd in the light of accounts about groups of barbarians potentially attacking in bands of up to 60 men.[82]

The modest ability of the Roman military to provide escorts meant that merchants needed to employ their own private security when crossing the Eastern

78 Sidebotham (2011a): 163 (problems with bandits); Young (2001): 85 (increased problem in late-second to third century CE); Adams (2001): 157 (Koptos an area of unrest). A bandit attack on an Indian caravan is an integral part of the plot of Xenophon of Ephesus' *Ephesian Tale* (3.11.4.3).

79 A series of ostraka from Xeron (c. reigns of Alexander Severus or Gallienus) record distributions of wheat to indigenous individuals. Possibly indicating a policy of appeasement or a payment for services rendered—Cuvigny (2014): 188–194. A papyrus from Berenike broadly dating to the latter first century CE also records the distribution of bread to some *barbaroi*—*P. Ber.* 266—Ast and Bagnall (2016): 56–58.

80 *I.Pan.* 87; Cuvigny (2006c): 348–349, believes the action took place around the date of the engraving (122/123 CE) written on the Colossus of Memnon by Serenus, see *I.Memnon* 20. See also Cuvigny (2014): 177–178.

81 Cuvigny (2005): 25, 77–82, 94, 154—see for example K458, K315, K519a; *O.Krok.* 87.

82 For example, K523—Cuvigny (2005): 7, 124.

Desert. This is certainly stipulated in the Muziris Papyrus, which reports that private escorts were arranged in advance.[83] The Koptos Tariff also indicates that guards (clearly not military personnel) were charged five *drachmae* ([φυλ]άκου δραχμὰς πέντε) for crossing the Eastern Desert.[84] It is very likely that large numbers of guards would gather at the Red Sea ports at peak seasons—notably during the February to March period, when vessels would arrive back from India—in order to offer up their services.

The fact that security was mostly a private concern for merchants has led Young to argue that the fortlets were not primarily designed to be defensive, and that the military presence was largely concerned with clamping down on smuggling and ensuring the payment of taxes and tolls.[85] However, given the modest number of soldiers manning them, it would have been beyond the capacity of the Prefect of Berenike to provide large escorts to most travellers while still securing the fortlets. Those soldiers that did accompany travellers probably had the mandate to seek help from the nearest fortlet in case of attack. Thus private security would have been relied upon for those stretches between the fortlets, with supplementary protection offered by soldiers. That the fortlets were intended to have a protective function is indicated by a dedicatory inscription set up to commemorate the Via Nova Hadriana, a route running from Antinopolis (Sheik ʿIbada) up to the Red Sea and down the coast to Berenike. It states explicitly that the route was designed to be level, run through safe country, and be equipped with plentiful wells, stations, and guard posts.[86]

Young's claim that the fortlets would have been placed on higher ground if they were intended for security overlooks the fact that the stations needed to be placed in the wadi valleys, so that travellers were allowed easier access to stored water and the military could respond to attacks on the routes with greater rapidity. The attack on the fortlet of Patkoua shows that large numbers of barbarians could amass for an assault. Likewise, the towers and ramparts at many of the fortlets in the Eastern Desert confirm that defence was a major concern. It seems that the role that the Roman military performed in providing security should not be downplayed.

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83 *P. Vindob* G 40822 Recto, Column 2 Line 2–4.

84 *OGIS* 674 = *IGRR* I. 1183.

85 Young (2001): 69–74.

86 *OGIS* 701; Sidebotham and Zitterkopf (1998): 353–366; Sidebotham, Zitterkopf and Helms (2000): 115–126; Young (2001): 78–79—'(Hadrian) built the new Via Hadriana from Berenike to Antinöe, through safe and even places by the Red Sea, and equipped at intervals with plentiful wells, stations and guard posts.'

TABLE 3 *Problems of security: Krokodilo ostraka*

Reference	Summary of orders
K458	Escort accompanying the centurion Aurelius.
K315 (contains several records of orders)	1) Duty to provide an escort for travellers accompanied by donkeys. 2) To conduct the donkey loaded with barley and chaff to Myos Hormos and accompany its return to the prefect. 3) A mutilated order to furnish an escort for the prefect himself. All date to July 109 CE.
O. Krok. 87 ("Amphora of the Barbarians")	1) A report on the attack on the *praesidium* of Patkoua 13th March 118, by 60 barbarians. 2) A letter of Arruntuis Agrippnus to the curators of the *praesidia* of the Myos Hormos route (March 26, 118 CE), giving orders to the curators to assure the protection of travellers being menaced by barbarian attacks. 3) An address by the curator of Thonis Megale (April 2, 118 CE) to the centurion at Parembole, reporting on the "barbarians".
K519a	A fragment of an official correspondence mentioning an order from the prefect of Berenike to provide escorts for donkeys and camels by cavalrymen of the presidia.
O. Krok. 51 (109 CE)	A letter from a decurion to the curators mentioning an attack of the barbarians.
O. Krok 10	Fragmentary reference to barbarians in a copy of a circular.
O. Krok.47	A copy of a circular informing that a band of 61 barbarians has been reported.
K355 (Trajan)	A mutilated letter from Philokles mentioning some barbarians.
K423 (Trajan)	A mutilated letter of Zosirie mentions that the barbarians are on the move.
O. Krok. 60 (very early in reign of Hadrian)	A letter of Cassius Taurinus informing of the murder of three *monomachi* by some barbarians.
K693, column III lines 33–46	A message circulated stating that Roman troops had attacked and killed 61 *barbaroi* and that those in the stations should be on the lookout for reprisals.

Taxation and Tolls

The importance of providing security, however, does not detract from the military's role in monitoring the goods and people crossing the Eastern Desert. Soldiers may not necessarily have directly collected tolls from travellers and merchants, but they likely permitted individuals to pass through the region and clamped down on smuggling. The Koptos Tariff makes reference to an *apostolion*, probably a pass or ticket received upon paying the requisite tolls.[87] Similarly, the Berenike customs passes granted the bearers the right to pass through customs and load their goods onto ships for export. There may have also been some taxation (*quintana*—which seems to be a capitation tax) of internal trade by officials with the title *quintanesis* to help defray the cost of maintaining the routes. Certainly a *quintana* was collected at Berenike, but no reference is made from the ostraka found in the *praesidia* to such officials.[88]

It has been suggested that the issuing of "passes" meant that the authorities were able to collate data about the overall level of goods passing through the Eastern Desert.[89] In particular, Pintozzi has argued that the central government was proactive in this, with the local authorities merely acting as custodians of the area. As evidence for this view, she points to the use of Latin (rather than Greek) on the foundation inscription at the *praesidium* of Siket, and to the fact that the Prefect of Berenike answered directly to the Prefect of Egypt.[90] While it is possible that the central government was interested in collating this data, the only evidence currently available relates to the local level, such as the Berenike customs passes: a temporary set of (Greek) documents mostly recording the movement of goods like wine, oil, and grain.[91] It is notable that the ostraka from the fortlets along the Koptos-Myos Hormos route do not indicate that the *curatores* were involved in customs control.[92] However, the government may have had some awareness of the number of individuals travelling to India. This could be inferred from a census list from Arsinoe (72/73 CE), which records a Gaian, also known as Diodoros, who was given *epikrisis* (exemption from taxes on a person) because he was away in India.[93]

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87 For the meaning of the *apostolion* see Sidebotham (1986): 81; Young (2001): 50.

88 Bagnall, Helms and Verhoogt (2005): 51; Nappo and Zerbini (2011): 74–77. One ostrakon (109 CE) mentions an order to stop illicit trafficking of wood, probably relating to internal trade—Cuvigny (2005): 77—K315.

89 Sidebotham (1986): 111; Copeland et al. (2006): 150.

90 Pintozzi (2007): 366–367.

91 Bagnall, Helms, and Verhoogt (2000b): 3–14; Adams (2007): 226.

92 Cuvigny (2006c): 321.

93 *P. Lond* 2.260, 1.42; Raschke (1975): 241; Sidebotham (1986): 92.

The actual collection of taxes, duties, and tolls was administered either by civilian officials or was farmed out to private contractors. The latter practice may be evinced by Pliny's reference to Annius Plocamus, who had purchased the collection of the *vectigal Maris Rubri* during the reign of Claudius.[94] Young suggests that the *vectigal Maris Rubri* denotes the *tetarte* rather than a duty collected at the Red Sea ports, since he argues that harbour duties and desert tolls were state administered.[95] If this is the case, it must be assumed that Plocamus' freedman, who was sailing around Arabia at the time, was engaged in commercial business and not the collection of taxes, since it is clear from the Muziris Papyrus that the *tetarte* was collected at Alexandria.[96] However, the term *vectigalia* is often broadly defined as an indirect tax, and it is entirely possible that the *vectigal Maris Rubri* was a *portorium* (customs levy or harbour due), though it is not possible to be definitive.[97]

The Koptos Tariff, dated to 90 CE, records that the tolls for crossing the Eastern Desert were collected by the *arabarchos* under the auspices of the Prefect of Berenike.[98] The Muziris Papyrus (mid-second century CE) also mentions *arabarchoi* taking a percentage of goods in kind from a shipment that had returned to one of the Red Sea ports from Muziris.[99] Another separate, and probably subordinate office, is that of the *paralemptes* (receiver). These *paralemptai* appear in a number of relevant locations, including Koptos, Myos Hormos, and Berenike.[100] One inscription (mid-first century CE) refers to an Apollonos, *strategos* of the Ombeitus region around Elephantine and Philae as well as *paralemptes* of the Erythraean Sea (he is also described as the son of Ptolemaios, an *arabarchos*).[101] Claudius Chrysermos is recorded as holding the office of *paralemptes* in an inscription dated to August 30, 103 CE.[102] This office also appears in plural form in the Krokodilo ostraka.[103] Recently, two further inscriptions mentioning *paralemptai* have been discovered at Berenike. Both were found in the locality of the Great Temple. One of these inscriptions was dedicated to Isis by Eirenaios, a 'secretary of the Receiver's department' (June,

94 Pliny *NH* 6.24.84; Sidebotham (1986): 103–104; Sidebotham (1996f): 294.
95 Young (2001): 69.
96 For the *tetarte* see *P. Vindob* G 40822 Recto, Column 2 line 7–11.
97 For the term *vectigalia* see Rathbone (2008): 254.
98 *OGIS* 674 = *IGRR* I. 1183.
99 *P. Vindob* G 40822 Verso, Column 2 line 11–13.
100 For appearances of the word *paralemptes* and its usage see Ast and Bagnall (2015): 178–183.
101 *OGIS* 202 = *CIG* III. 5075 = *SB* V 7951–7952.
102 *I. Portes* 70.
103 Cuvigny (2005): 59–62—K256 and K312; Ast and Bagnall (2015): 177.

24 49 CE); the other refers to Gaius Julius Eucharistos, 'secretary of the spice magazine' (*grammateus apothekes aromatikes*), honouring Gaius Julius Faustinus, 'Receiver of Berenike' (July 25, 112 CE).[104]

Burkhalter argues that instead of collecting local taxes, the *paralemptai* seem to have been the officials at the Red Sea ports who assessed how much tax was to be paid on the imported merchandise. Having done so, the merchandise received official seals allowing these products to be transported to Koptos and then to Alexandria.[105] This notion is plausible, since the government certainly desired that no illicit profit could be made from sales of untaxed goods. Indeed, not only is their reference to goods being placed under an individual's seal in the Muziris Papyrus, but finds of a wooden tag and a stamped lead seal from Berenike appears to support this practice.[106] It will have made perfect sense to have initial assessments made at the Red Sea ports, followed by subsequent verifications (at Koptos and at Alexandria) in order that goods did not "vanish" in transport.[107]

The most important tax collected by the Roman state was, of course, the *tetarte* placed on Indian Ocean imports at Alexandria. There have been various estimates made of the potential scale of the revenue generated. Speidel points to several ancient sources that suggest that the revenue Egypt generated doubled between the late Ptolemaic period and the Flavian period (300–350 million to 600 million *sestertii*). He also points to Strabo's figure of 120 ships per annum and the quarter tax paid on the total value of the cargo mentioned in the Muziris Papyrus (which he puts at 1.7 million, *contra* Wilson's 2.3 million figure) to suggest a potential 200 million *sestertii* in annual revenue.[108] McLaughlin has even argued that this revenue was necessary to prevent a crisis for the Roman state in terms of its expenditure. He suggests that the agrarian tax bases of many provinces were insufficient to cover the costs of their military garrisons, but that the customs revenue generated at Alexandria as a result of the Indian Ocean trade helped defray them. He even goes so far as to suggest that the province of Egypt (including the revenue from the *tetarte*) produced 700 million *sestertii* per annum, and that the *tetarte* itself provided nearly a

104 Trans. from Ast and Bagnall (2015): 172–174; Zych et al. (2016): 338–339.

105 Cuvigny citing Burkhalter (2005): 15–16. See also Cuvigny (2014): 172.

106 Sidebotham and Zych (2012a): 38.

107 Ast and Bagnall (2015): 181–182.

108 Speidel (2015): 104–105. n. 81 and 82. Wilson ((2015): 23) employing a similar method comes up with a figure of 230,000,000 million *sestertii*; McLaughlin ((2014): 14) 250 million *sestertii*.

third of the Roman state's finances.[109] It is likely that this revenue was highly beneficial, although it is open to question whether the state's finances were this unbalanced. It should also be pointed out that the Roman state significantly increased the pay of its soldiers under Septimius Severus and Caracalla. At this point in time, the revenues deriving from the Indian Ocean trade were likely much less than they had been during the first century CE.[110]

Roman Military and Diplomatic Policy

The Roman state directed significant resources towards (re)constructing and manning fortlets in the Eastern Desert to protect travellers, monitor the routes, and hinder smuggling. Some scholars, however, go further, arguing that the Roman state directed its military and diplomatic policy to advance the commercial interests of its merchants in the Indian Ocean. This is most notably exemplified by the highly doubtful idea that Augustus attempted to break a supposed Arab trade monopoly.[111] It has already been noted in Chapter 2 that direct voyages to India were starting to be undertaken by merchants from the Mediterranean world around the late second and early first century BCE. Moreover, the idea that Arab merchants jealously guarded secret knowledge of the monsoon winds is patently absurd. Nevertheless, this theory has its proponents.

Aelius Gallus' expedition to southern Arabia (26/25 BCE) is one of the central pieces of evidence cited by those advocating the view that Augustus attempted to eliminate the Arabs as middlemen.[112] It should be pointed out, however, that Strabo claims Augustus' motives were to explore the territory and win over

109 McLaughlin (2010): 164–168, 171–172; McLaughlin (2014): 7, 16, 88, 219–220. Wilson (2015): 30–31, also notes the comparative significance of the revenue from the *tetarte* compared to sources from other provinces. For a critique of McLaughlin's revenue reconstructions see Scheidel (2015): 160–161 n. 44.

110 See Chapter 9.

111 Thorley (1969): 211, 213, 217; Schmitthenner (1979): 104–105; Phillips (1997): 450; Cuvigny (2010a): 429; Fitzpatrick (2011): 51; McLaughlin (2014): 78–79.

112 Rostovtzeff (1957): 53, 66, 94; Bowersock (1983): 46–47; Gurukkal (2016): 242. Alternatively Speidel (2015): 96, suggests that the Arabian and Ethiopian campaigns were a two pronged attempted to control the Red Sea region. McLaughlin (2014): 7, suggests it was motivated by the urgent need to find sufficient funds to sustain long-term military costs. Davidde (2017): 581, has suggested that it was motivated by the desire to 'secure the monopoly of the harbours along the route from Egypt to India.'

or conquer the Arabs who had such vast wealth.[113] He makes no reference to aggressive behaviour by Arab polities that prevented Mediterranean merchants from sailing beyond the Gulf of Aden, a notion that does not make sense in light of the fact that direct voyages to India pre-date the Roman period. It should also be stressed that Augustus mentions nothing about wanting to eliminate a (non-existent) Arab monopoly in the *Res Gestae Divi Augusti*.[114]

The second piece of controversial evidence cited in favour of this theory is a reference in the *Periplus* to the sacking of Aden by Caesar (*Kaīsar*).[115] As noted in Chapter 2, there has been some debate as to whether this reflects genuine Roman military action. The evidence certainly does not sustain the view that either Aelius Gallus or Gaius Caesar sacked the place, since the former did not get beyond Ma'rib and the latter never campaigned in southern Arabia.[116] This is not to suggest that the Roman state was unable to conceive of advancing its merchants' commercial interests through warfare, only that the idea of eliminating Arab middlemen does not appear supportable given the evidence.

Red Sea Fleet

The Roman state did maintain a naval presence in the Red Sea, and it is probable that one of its duties was to protect merchants against piracy. However, this protection almost certainly did not extend outside the Red Sea proper. As a result, merchants would have needed to employ security for their vessels. Pliny writes that pirates were a threat in certain regions, particularly in the vicinity of Muziris, and so it was necessary to have archers on board.[117] This does not seem to be unusual, since an incidental comment made by Juvenal suggests it was common in the Mediterranean as well.[118] Philostratus also seems to confirm that merchant ships carried armed detachments, and the Pithom stele reveals that this was likewise the case during the Ptolemaic period.[119] There is little reason to assume, as Whittaker and Gurukkal do, that the archers mentioned in the classical sources were Roman military personnel.[120] Both the Koptos Tariff and the Muziris Papyrus make it clear that private security was hired to protect the

113 Strabo 16.4.22; see Sidebotham (1986): 121; *contra* Sidebotham (2011a): 177.

114 *Res Gestae* 26.5; more broadly see Sidebotham (1986): 120–130.

115 *Periplus* 26.

116 Sidebotham (1986): 130–131—Pliny *NH* 6.31.141.

117 Pliny *NH* 6.26.101.

118 Juvenal 6.153–157.

119 Sidebotham (1986): 70; Phil. *VA* 3.35; see also Curtin (1984): 114, for the general use of armed personnel in many periods of trade in the Indian Ocean.

120 Whittaker (2004): 167; Gurukkal (2016): 65. Whittaker claims that these archers must have

caravans crossing the Eastern Desert. There seems little reason to presume that private security was not also hired for voyages.[121]

The size of the Roman naval presence in the Red Sea region is not known for all periods, and it may have fluctuated. It is known that in the 20s BCE a fleet of 130 warships was constructed by Aelius Gallus, as part of his failed military campaign in southern Arabia (Strabo notes these vessels were, in fact, unnecessary), but it is not clear how many of them were kept in service afterwards. It is probable that at least some were maintained at Myos Hormos, which Strabo refers to as a naval station.[122] Sidebotham purposed that Annius Plocamus, as collector of the *vectigal* of the Red Sea, might have utilised land and sea forces for protection (not uncommon for tax collectors).[123] However, Pliny's testimony is not detailed enough to be sure one way or the other.

The Nikanor archive contains two ostraka that refer to a trierarch (commander of a trireme) and *tessararis liburnou* (a liburna is a swift galley).[124] In the late first century CE, a papyrus from Myos Hormos (93 CE) mentions a soldier called Lucius Longinus who served on the Hippokampos, a dispatch galley (*tesseraria*).[125] Eutropius mentions the creation of a *classis Maris Rubri* by Trajan 'to lay waste to the coast of India' (*ut per eam fines Indiae vastaret*). However, if this fleet was actually created, it may either be connected to Trajan's Parthian campaign and its establishment (temporarily) in the Persian Gulf (sometimes referred to as the Erythra Thalassa), or in the Red Sea itself, with "India" signifying East Africa.[126] There is certainly no evidence to suggest that any Roman naval expedition ever reached the coasts of India.

Whatever the potential size of the Roman naval presence from the period after Aelius Gallus' expedition, it is clear from the presence of soldiers on the Farasan Islands near the entrance to the Red Sea (c. 1,000 kilometres south of

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been part of the Roman military because of the '… Roman sensibility about allowing anyone to carry arms privately in the Empire.'

121 *P.Vindob.* G 40822; *OGIS* 674 = *IGRR* I. 1183.

122 Strabo 16.4.23 (fleet of Aelius Gallus), 17.1.45 (naval station at Myos Hormos).

123 Sidebotham (1986): 69; Pliny *NH* 6.24.84.

124 *O. Petr.* 296 (c. first-half of the first century CE); *O. Petr.* 279 (September 16, 52 CE); Sidebotham (1986): 69–70; Speidel (2015): 95; Nappo (2015): 60–62.

125 For the *tessararia* see P. 004—Van Rengan 2011: 335–336.

126 Eutropius *Breviarum ab urbe condita* 8.3; also Festus *Rerum gestarum populi romani* 20; Jordanes *Romana* 267–268. In the Late Antique period the region of East Africa and Southern Arabia could be known as India, sometimes distinct from "Inner" India, which designated India proper—see Mayerson (1993). Speidel (2015): 94, suggests that Eutropius meant an attack in the southern Red Sea region.

Berenike) that transport, supply, and communication ships must have operated between the islands and the Red Sea ports. Evidence for the presence of soldiers on these islands comes from two Latin inscriptions found on al-Sughra and al-Kubra. The former inscription can be dated to 144 CE. It records that a *vexillatio* of the *Legio II Traiana Fortis* (a legion stationed in Egypt at this time), its auxiliary troops, and the *castrenses* had made a dedication on the orders of the prefect of the *portus* (?) of Farasan and the sea of Hercules (?). The latter reference is possibly an indication that the Bab-el-Mandeb was regarded as an eastern equivalent of the Pillars of Hercules. The second inscription (very fragmentary) was found on the larger island of al-Kubra, which has a good natural port, natural wells, fauna for hunting, and some land for agriculture. This inscription may refer to the *Legio VI Ferrata*, although the reading is not clear. If this is the case, it would most likely be in connection to the *propraetor* of Arabia, possibly suggesting a presence on the island around the period 110–135 CE.[127]

These inscriptions would suggest that the Romans were interested in maintaining a military presence in the southern Red Sea at least during the first half of the second century CE.[128] Villeneuve argues that this must have ceased before Axumite domination of the lower Red Sea region in the third century CE.[129] However, there is no direct evidence for the Romans abandoning the Farasan Islands or being ejected by the Axumites. Indeed, in the sixth century CE, the *Martyrium Sancti Arethae* records that the Byzantines sent seven transport ships from the Farasan Islands to join those from Clysma, Aila, Berenike, and the island of Iotabe in the Axumite attack on the kingdom of Himyar (in Yemen).[130]

Villeneuve may be correct to connect this Roman military presence with the protection of merchant shipping against piracy and, possibly, to prevent smuggling. But another motive would have been to secure Rome's military interests in the southern Red Sea.[131] Any naval presence must have been restricted to the Red Sea, as it is unlikely that Roman warships would have accompanied

127 Villeneuve (2007): 24–25 (110–120 CE); Speidel (2015): 89 (114–132/135 CE); Nappo (2015): 67–68 (no later than 139 CE).

128 Speidel (2015): 90, suggests that the Romans may have acquired the islands after the annexation of Nabataea.

129 Villeneuve (2007): 13–26; Speidel (2015): 93, suggests that Aelius Aristides' *Roman Oration* (70) may refer to conflict in the southern Red Sea under Antoninus Pius.

130 *Martyrium Sancti Arethae* 27–29.

131 Villeneuve (2007): 25; see also Speidel (2015): 91–93 (securing Roman military interests); Nappo (2015): 68–69 (domination of Red Sea region). Nappo (2007): 236–237, also specu-

merchants into the open waters of the Arabian Sea during monsoon weather conditions.[132] Traditional Graeco-Roman warships, like biremes and triremes, usually sailed along the coast and beached each day. They were certainly not designed for long periods out on the open sea in rough conditions; therefore, merchants mostly relied on private security on board their ships.

Embassies and Diplomatic Policy

A number of Graeco-Roman writers report that embassies from Arabia Felix and India travelled to the Roman Empire, especially under Augustus and Trajan.[133] Claudius, too, is said to have received an embassy from Taprobane (Sri Lanka).[134] Florus is the only Western source during the Principate to speak of an ambassador from the Seres ("silk people"—possibly inhabitants of remote Central or East Asia, or China) visiting the Roman Empire. He purports that they did so in the reign of Augustus.[135] One might doubt that such an embassy took place if the Seres are to be identified as Chinese, since none of the Chinese sources suggest an awareness of the Roman Empire at this early stage.[136] The earliest date that Chinese sources do give for an attempt to send an embassy to the people of Da Qin, usually identified with the Roman Empire, is in 97 CE (which never reached its intended destination).[137]

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lates on the presence of a customs house. Broekaert (2017): 8 (protecting revenue derived from taxing the commerce/ensuring stability).

132 Sidebotham (1986): 70.

133 Augustus—*Res Gestae* 5.31; Strabo 15.1.4, 73; Suet. *Aug.* 21; Cass. Dio 54.9; Aurelius Victor *De Caesaribus* 1–9; Paulus Orosius *History Against the Pagans* 6.21.19; one of the emperors between 40–70 CE—*Periplus* 23; Trajan—Cass. Dio *epitome* 68.15; Hadrian—*SHA Hadrian* 21; Aurelian—*SHA Aurelian* 61. Speidel (2015): 104, 107, speculates that the gifts from Charibael (*Periplus* 23) could be tribute, while the possible appearance of Augustus' head on the obverse of Sabaean coins may indicate subordination.

134 Pliny *NH* 6.24.84. See also Ammianus Marcellinus (22.7) who mentions a delegation form Taprobane coming to the court of Julian (361–363 CE).

135 Florus 4.2. There is reference to the Seres visiting Aurelian during his triumph in 274 CE—*SHA Aurelian* 61. See Robert (1997): 67–96, 135; Weerakkody (1996): 73; and Wood (2002): 29–30, for discussion of the Seres and their identification; Leslie and Gardiner (1996): 13, believe that by time of Pliny (or at least Ptolemy) the Seres (and the land of Thin) could be associated with China. Hildebrant (2017): 34, argues that such ethnological and geographical parameters are too limiting, and that the Seres could be any unknown peoples linked to the silk trade.

136 Leslie and Gardiner (1996): 33, 126.

137 *Hou Han Shu* 88; Leslie and Gardiner (1996): 15.

By contrast, there are very few references to embassies going the other way in either Western or Eastern literary source, the notable exception being the supposed embassy from Da Qin mentioned in the *Weilüe* (*A Brief History of the Wei*) and *Hou Han Shu* (*Book of the Later Han*). This is said to have appeared in Southeast Asia around 166 CE before being taken to the Chinese imperial court.[138] Such a meeting may well have taken place, although there is no equivalent testimony in Graeco-Roman literature, and it is often supposed that this "embassy" consisted of merchants who passed themselves off as ambassadors or were understood as such.[139] It is not until the Late Antique period that we start to hear of some embassies being sent from the Roman Empire. One reference includes the sending of Theophilus (356 CE) to the king of Himyar to seek permission for Roman traders to set up churches.[140] The *Itinerarium Egeriae* also mentions an official called a *logotherte* being sent from Clysma to "India" each year (originally composed in the late fourth century CE, but only surviving from later fragments).[141] As noted in Chapter 2, "India" could be conflated with other regions, such as East Africa, so the ultimate destination of this official remains uncertain.[142]

Some argue that these embassies discussed trade issues despite the fact that none of the sources indicate that such matters were raised.[143] It has even been claimed that special treaty ports were established: a highly speculative theory, based on the terms *emporion enthesmon* mentioned in the *Periplus*, and the occasional use of the term *emporion* in connection to some Indian ports in Ptolemy's *Geography*. It is assumed that this term refers to treaty ports.[144] However, in the *Periplus*, the term *emporion enthesmon* is used in reference to the port of Kalliena (coast of western India).[145] The term *enthesmos* does mean lawful, although Casson argues from the context it is merely an allusion to formerly

138 *Hou Han Shu* 88. In addition, see *Liang-Shu* 48 (seventh century CE), which mentions an embassy in 226 CE; *I-Wen Lei-Chu* 76, which mentions receiving tribute in 281 CE; *Nan-Fang Tsao-Ma Chuang* 9, which also mentions tribute in 284 CE—no confirmation exists in any western sources. See also Ball (2000): 135; and McLaughlin (2010): 139.

139 Schoff (1917): 243; Banerjee (1921): 41–42; Charlesworth (1924): 72; Warmington (1928): 131; Sidebotham (1996f): 299; Graf (2017): 478; *contra* Leslie and Gardiner (1996): 14, 176.

140 Philostorgius *Hist. ecc.* 3.4.

141 *Itinerarium Egeriae* 6.4.7.

142 See Mayerson (1993); Schneider (2004); and Schneider (2016b).

143 For example—Kearney (2004): 43; Smith (2009): 89; Strauch (2012): 374.

144 Miller (1969): 19–20; Whittaker (2004): 146, 167; *contra* Casson (1989): 272–276.

145 *Periplus* 52.

peaceful conditions under its previous rulers.[146] The use of the term *emporion* by Ptolemy is more likely to be indicative of ports possessing harbour facilities.[147]

It has recently been asserted that it was highly beneficial for the Roman state to establish relations with various polities in order to facilitate trade. Kobl and Speidel cite the declarations of Roman jurists, notably Sextus Pomponius, as proof of the importance of establishing friendly or formal relations. This was to ensure that merchants and their property remained unmolested.[148] They do, nevertheless, acknowledge that such diplomatic relations were not a necessary prerequisite for trade. It also needs to be said that the Roman state, even if it had such relationships, possessed little means of militarily enforcing protection for their subjects' property in territories well beyond their reach (as is the case with all Indian polities). That merchants would be concerned about their safety and possessions is a certainty, and, as Speidel rightly points out, they would be anxious about their agreements in foreign lands being enforced.[149] Whether this depended upon interstate relations, as opposed to relations between merchant communities and the authorities, remains at present unresolved.

It is quite possible that the establishment of friendly relations between the Roman state and various polities connected by the Indian Ocean was beneficial to trade. There is no reason to assume that the Romans were unable to conceive of directing their diplomatic or military policy to advancing commercial ends. The problem is that the evidence, as it currently stands, is insufficient to support Kobl's and Speidel's theory. First of all, as has been noted, none of the Graeco-Roman sources mention trade issues in relation to the embassies that came to the Roman Empire. Secondly, there is a dearth of evidence for the Principate, which would suggest that the Roman state sent out its own embassies to these eastern lands. Absence of evidence is not evidence of absence, but it

146 Casson (1989): 274–276—in fact the term *emporion nomimon* is used to designate a legally limited port of trade (all trade controlled by the authorities). Kolb and Speidel (2015): 131, suggests *emporion enthesmon* (lawful trading station) may refer to a formal agreement to protect Roman traders from pirates.

147 Casson (1989): 271; H. Ray (2015): 136.

148 *Amicitia* (friendship)—*hospitium* (rights of hospitality)—*foedus amicitiae causa* (a formal treaty for the purpose of friendship). *Digest* 49.15.5.2; Kolb and Speidel (2015): 129–131. Speidel (2015): 112–116, points to a series of coins issued by the Kushan ruler, Kujala Kadphises (c. 30–80 CE), showing a bust of a Julio-Claudian emperor on the obverse, as possible evidence for some kind of *amicitia* agreement. On *amicitia* agreements see also Broekaert (2017): 9.

149 Speidel (2015): 87.

is currently difficult to assert that the Roman state proactively advocated the interests of its merchants through diplomatic means.

The Imperial Family's Commercial Interests?

The Roman state had substantial quantities of Indian Ocean goods, especially spices and aromatics, stored in its own warehouses. This is most obviously the case in Alexandria, where it collected its *tetarte* in kind. This may also have been the case in Rome, where Domitian established the *Horrea Piperataria* (burnt down near end of Commodus' reign, and eventually built over in the reign of Maxentius).[150] The existence of clay seals in Alexandria with the designation 'the spices of Caesar' seems to support the ownership and transport of such goods by the state.[151] It is likely that the state was also receiving some of these spices through revenue derived from eastern estates that had interests in Indian Ocean commerce. Seland points to references in the *Liber Pontificalis* about contributions of spices and aromatics to churches in Rome from estates in Egypt, Syria, and Phoenicia (under Pope Sylvester, 314–335 CE) as a likely reflection of similar practices with imperial estates.[152]

Some have gone a step further and contended that the Roman imperial family not only acquired large quantities of Indian Ocean goods from tax revenues and profits from its estates, but actually had direct commercial involvement in the trade, albeit conducted by imperial slaves and freedmen. This idea, proposed by Sidebotham in his *Roman Economic Policy in the Erythra Thalassa 30 B.C.–A.D. 217*, has recently been restated by Bowman.[153] Sidebotham suggested that several individuals operating in the Red Sea and the Eastern Desert could be identified as imperial agents. One such individual was an Epaphrodeitos, recorded in the Nikanor archive as present at Myos Hormos with Ammonius Chairemenis on the July 22, 62 CE.[154] They received an assortment of goods including, grain, wine, and bags of silver money and plate. In the Berenike customs passes, an Epaphroditos, slave of Delias, slave of Aeimnestos,

150 Cass. Dio 72.24.

151 McLaughlin (2014): 193.

152 Seland (2012a): 117–125.

153 Sidebotham (1986): 114; Bowman (2010): 106–107. Nappo and Zerbini (2011): 65, note it cannot be ruled out.

154 *O. Petr.* 290. A Gaius Julius Epaphrodites (either the same or another individual) is mentioned in several of the Berenike customs passes involving the movement of wine—*O. Ber.* 147–148—Bagnall, Helms and Verhoogt (2005): 60–61.

slave of Caesar, appears several times.[155] It is unclear if he has any connection to the Epaphrodeitos of the Nikanor archive. Other individuals called Epaphroditos appear in connection to imperial estates in Egypt before and during Nero's reign, at Mons Claudianus and Mons Porphyrites during Hadrian's reign, and twice along the Koptos-Myos Hormos route. Sidebotham attempts to link the Epaphroditos at Myos Hormos with the appearance of the name on the Koptos-Myos Hormos route, although the dates of the graffiti are uncertain.[156] He further suggested this individual was Nero's freedman Tiberius Claudius Epaphroditus, who had served as a *cubiculo* and *libellis*.[157]

A second individual named Anikētos Kommonos appears in the Nikanor archive as a slave or freedman of the Emperor Tiberius. Several ostraka show that he arranged for goods (wine and bread) to be transported from Koptos to Berenike over a two-and-a-half-year period.[158] Sidebotham argued that Tiberius, like Nero, had an active personal interest in Red Sea trade, and that this Anikētos was also Nero's boyhood tutor and later commander of the fleet at Misenum.[159] There is no doubting that the Anikētos Kommounos mentioned in the Nikanor archive was directly connected to Emperor Tiberius, although whether this was the Anikētos mentioned by Tacitus is conjecture. Another possible, but conjectural, connection that appears in the Berenike ostraka is a Stichus, slave of Narcissus; the latter is potentially the famous freedman of Claudius, who owned Egyptian estates.[160]

A Zethos, slave of Tratos, slave of Caesar, also appears in both the Nikanor archive and the Berenike ostraka.[161] However, there are reasons to doubt that Zethos was connected to the trade, because in the ostrakon from the Nikanor archive he is mentioned as receiving goods from the public store. In addition, the ostrakon from Berenike does not share the common formula of many of the others, which refer to releasing goods for outfitting. Instead, it has a formula analogous to that of the Petrie ostraka.[162] Thus, it may be that this freedman was procuring supplies rather than trading goods. Indeed, the Imperial treasury owned many estates in Egypt during the first century CE.[163]

155 *O. Ber.* 184–188.

156 Sidebotham (1986): 89–90; *OGIS* 678; *IGRR* I.1256; see also A. Bernand (1972): 117–120, no. 55.

157 Bagnall et al. (1979): 243; Sidebotham (1986): 90; *CIL* vi. 8759; Suet. *Ner.* 49.

158 *O. Petr.* 237–239, 242, 247.

159 Sidebotham (1986): 89, 141; Tac. *Ann.* 14.3.

160 *O. Ber.* 193—Bagnall, Helms and Verhoogt (2005): 80–81.

161 Sidebotham (2011a): 70; see also Sidebotham (2007): 202.

162 *O. Ber.* 106—Bagnall, Helms, and Verhoogt (2000b): 7; *O. Petr.* 292—Tait (1930): 124.

163 See Shatzman (1975) for discussion of Imperial estates in Egypt.

Some of the products of these estates did reach the Red Sea ports as indicated by a wine stopper found at Myos Hormos, bearing the text *Titus Flavus … allis*.[164] Sidebotham suggested that this might be indicative of one of the Flavian emperors receiving direct income from the trade.[165] However, others have argued that the transport of goods to the Red Sea and the presence of imperial freedmen actually connect to administration rather than trade. They also suggest that the goods mentioned in the Nikanor archive should be seen as supplies (especially as the Nikanor ostraka mention wine and foodstuffs). Young further argues that had the government been involved in the trade, this would not have been sufficient to offset the cost of the facilities in the Eastern Desert.[166]

In assessing these two contrary positions, it should be noted that the Nikanor archive only really provides information about who was receiving particular goods, and not what these Imperial freedmen did after receiving them. As noted, in the case of Zethos, the evidence seems to point to him engaging in an administrative role. However, some of the freedmen mentioned, notably Tiberius Claudius Epaphrodeitos, received an assortment of cargoes, including grain, wine, and silver money and plate; the latter seems less easily dismissed as supplies. Furthermore, in his case, there is no reference to goods from the public stores.[167] There is equally little evidence to reveal the precise function that these imperial freedmen may have performed in the administration of the Eastern Desert and the Red Sea ports. It should also not be assumed that grains and wines necessarily refer to supplies rather than commercial products.[168] Consequently, while Sidebotham's theory needs to be treated with caution, it is a possibility that should not be ruled out. Indeed, a reference in the *Historia Augusta* to a Firmus sending out merchant vessels to the Indians suggests that it is not beyond the realms of possibility that imperial authorities could have done something similar in earlier periods.[169]

164 Bagnall et al. (1979): 243–244.

165 Sidebotham (1986): 91, 114.

166 Casson (1989): 38 n. 74; Young (2001): 61.

167 *O. Petr.* 292 (Zethos); *O. Petr.* 290 (Tiberius Claudius Epaphrodeitos).

168 Anikētos Kommonos freedman of Tiberius Caesar Augustus—*O. Petr.* 237 (insufficient surviving detail), *O. Petr.* 238 (six Ptolemaika of wine), *O. Petr.* 239 (insufficient surviving detail), *O. Petr.* 242 (14 keramia of Ptolemaikos wine / two cargoes of 17 keramia); Pakoibis son of Horos—*O. Petr.* 247 (a keramion of Onisia wine of Tiberius Augustus and a Kolophonia …); Apollonios slave of Phanios of God and Helios Gaius Caesar Augustus Germanicus—*O. Petr.* 258 (insufficient surviving detail); Tiberius Claudius Epaphrodeitos—*O. Petr.* 290 (three bags of silver money and one basket of silver plate).

169 SHA *Qaud. Tyr.* 3.3.

An alternative, speculative explanation might hold that these imperial freedmen were not trading directly on behalf of the Imperial family, but on their own account. Evidence from the banking documents of the Sulpicii of Puteoli (discovered at Pompeii) shows that imperial freedmen did trade on their own behalf with their own funds.[170] It is not inconceivable that the same thing took place in the Red Sea.[171] At this stage, the question of the Imperial family's direct commercial investment in the Indian Ocean trade remains unresolved.

Summary

The (re)construction, maintenance, and manning of fortlets in the Eastern Desert was a major concern of the Roman state. These fortlets housed cisterns used to supply those residing in the stations and people travelling between the Red Sea and the Nile. They allowed the routes to be monitored, communications to be maintained (along with the use of *skopeloi*), smuggling to be hindered, and protection to be provided. Young's overemphasis on the role of securing tax revenue and downplaying of security concerns needs to be reconsidered in the light of the Krokodilo ostraka, among other evidence. The potential for attacks by local nomadic populations was a real concern, and these appear to have increased around the latter first and early second century CE, although security was probably always an issue. The Roman state may also have afforded merchants some protection from piracy in the Red Sea region.

Some scholars have gone further than simply pointing to the role of the Roman military in providing security in the Eastern Desert and the Red Sea proper. They suggest that Rome's military and diplomatic policy was directed to advancing commercial concerns relating to the Indian Ocean trade. With regard to these theories, the idea that Augustus attempted to eliminate the Arabs as middlemen is difficult to sustain. It is not impossible that Roman treaties of friendship with various eastern polities may have been of benefit to traders, but the evidence is not sufficient to be more definitive. Finally, Sidebotham's controversial theory that the imperial family had direct commercial interests in the Indian Ocean trade should not be completely discounted, but nevertheless, needs more hard evidence before being confirmed.

170 D. Jones (2006): 97–98, 105–106—for example a Hesychus Evenianus, a slave of Caligula, is reported in a contract to have lent 1,250 *sestertii* in Puteoli—Tpsulp. 68 15th September 39.

171 Bowman (2010): 106, notes the demarcation between the private and public interests of these freedman may be difficult to draw. See also Tomber (2017): 541–542.

CHAPTER 5

Trade Routes and Merchant Diasporas

In Chapter 2, it was argued that by the late Ptolemaic period Mediterranean merchants were increasingly engaged in direct voyages to India through the use of the monsoon winds. This chapter returns to the theme by examining how these monsoon winds were utilised in Roman times. This is important for enabling an appreciation of the geographical context of the routes traversed by Mediterranean merchants, as well as the temporal context: namely, how the seasons and weather conditions impacted on travelling schedules. It is clear from the available evidence that a circuitous exchange of goods could take place between Alexandria and India within a year, while the Mediterranean world had its own annual trade circuits. However, if one imagines the hypothetical transport of goods from Rome to India, with a new set of Indian goods being returned to Rome, then it is clear that this commercial proposition would span more than a year. The available evidence for sailing times suggests that even in consistently favourable conditions it would take at least 13 months, while under consistently poor conditions it could take as long as 20 months. As a result, most full cycles of exchange (a complete circuit between Italy and India) would likely fall somewhere between these two estimates.[1] This is not to imply that Rome did not receive Indian Ocean goods each year, or that India did not receive Mediterranean goods. However, it does highlight that the Rome-Alexandria and Alexandria-India routes formed two distinct networks of exchange. This is of consequence both for the idea that some Italian merchants practiced vertical integration and the extent to which central or Western Mediterranean goods were exported.

A second, related issue considered in this chapter is merchant "diasporas": communities of merchants and others who resided in foreign emporia beyond short-term seasonal stopovers. There is some evidence to support the idea that Roman merchants were residing in Arabian and Indian emporia. Likewise, there is evidence for Arabian and Indian merchants residing at the Red Sea ports. However, the archaeological and written evidence on which these arguments are based is not without its complications. For example, it is argued here that coarse or domestic pottery is more likely to be an indicator of resident foreign merchants than fine wares. Ultimately, the existence of merchant

1 Cobb (2014): 89–116.

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diasporas is highly plausible, but the evidence still needs to be treated with a great deal of caution. Some scholars have given too much credence to the idea that not only merchants, but also artisans and mercenaries integrated into Indian communities, even in inland areas.[2] These scholars primarily make such claims on the basis of references to Yavanas in Tamil literature and a few Indian inscriptions. However, as will be shown, the term Yavana is complex, and cannot always be tied to Greek-speaking peoples from the Mediterranean world.

The third section of this chapter goes beyond the routes used by Roman merchants operating in the Arabian Sea (north-western Indian Ocean) and examines the extent to which Roman merchants were directly trading in the Bay of Bengal (eastern Indian Ocean), even going as far as Southeast Asia. Some scholars have advocated the idea that Roman merchants were increasingly operating in these areas by the second century CE.[3] Contrary to this position, it is argued here that the presence of Roman goods within these regions, limited as it is, is far more likely to be a result of Indian and Southeast Asian trade networks. It will also be shown that references to Da Qin (literally 'Great China'), usually taken to indicate the Roman Empire in early-middle Chinese sources, are potentially problematic.

Trading Routes and Schedules

The evidence for reconstructing the routes and trading schedules employed by Roman merchants in the Indian Ocean mostly comes from written sources (literary texts, ostraka, papyri, and graffiti). Pliny provides the most detail in his outline of the timing and routes taken by merchants journeying from Alexandria to India.[4] The author of the *Periplus* also records departure dates from the Red Sea ports to East Africa, the southern Arabian Peninsula, and India, but does not give the same kind of detail about the timing of individual segments of the journey. Nevertheless, his comments do offer useful confirmation of statements made by Pliny. Comparisons of the Koptos to Myos Hormos and Berenike routes are also derived from Strabo and Pliny, respectively. These authors, while preferring the written accounts of well-born men, nonetheless do employ information derived from contemporary merchants (despite Strabo's expressed contempt for them).[5] Studies by Casson, Duncan-Jones,

2 For example, H. Ray (1988): 311–325; Dhavalikar (1992): 325–327; McLaughlin (2014): 182.

3 See H. Ray (1996a): 1–10; H. Ray (1996b): 351–364; Weerakkody (1996); McLaughlin (2010).

4 Pliny *NH* 6.26.96–106.

5 Strabo was in Egypt in the mid-20s BCE and derived reports about travelling conditions while

and Morley on trading schedules in the Mediterranean and the distribution of goods between regions are also useful for considering the integration of Mediterranean and Indian Ocean trading spheres.[6]

In reconstructing a range of travelling times it is important to stress that individual merchants did not necessarily retain possession of a single cargo from Italy to India (or vice versa). The original composition of a merchant's consignment may have been altered due to exchanges taking place prior to arrival at a terminal port. Furthermore, many major emporia offered goods deriving from a variety of locations.[7] The goods which ultimately ended up in Indian ports or at Rome may have changed hands several times. Nevertheless, documents such as the Muziris Papyrus and the *Periplus* do make it clear that direct custody of goods over significant distances did take place.[8] Similarly, those advocating the idea of vertical integration have suggested that some prominent Italian families had agents involved at various stages of the Alexandria-Italy and the Alexandria-India networks (see Tchernia for the Peticii wine interests and Schörle for the Calpurnii pearl interests). Whether or not this was a frequent practice is a moot point, since the main concern in this chapter is the various stages of transit for such goods (whether retained by the same merchants throughout the journey or not), and how organisational, bureaucratic, and climatic factors impacted on the times taken for these goods to reach each subsequent stage.

From Alexandria to the Red Sea Coast

The city of Alexandria is a logical place to begin, since it was the main hub where Indian Ocean goods were received.[9] It was also the place where the *tetarte* was levied before these goods could be sold on for distribution elsewhere in the Mediterranean.[10] Likewise, Alexandria was the main centre for the assemblage of goods to be exported in the Indian Ocean trade. Pliny mentions that those wanting to sail to India would head for Juliopolis, a place two

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he was at Syene, and no doubt from his friend Aelius Gallus who invaded Southern Arabia (2.5.12, 15.1.4, 17.1.13, 45). Pliny also drew on contemporary information derived from merchants (*NH* 6.26.96–106).

6 Casson (1950); Duncan-Jones (1990); Morley (2007b).

7 See *Periplus* 24 (merchandise from Adulis is available at Muza), 27–28 (goods from other ports available at Kane), 49 (silks available at Barygaza), 56 (silks, Gangetic nard, tortoiseshell from Chryse Island at Muziris).

8 Cobb (2014): 90–91.

9 Strabo 2.12.170; Dio Chrysostom 32.36; Joseph. *BJ* 2.382–386.

10 *P. Vindob* G 40822; see also Strabo 16.4.24, 17.1.13.

miles south of the city, and when the Etesian wind (north wind) was blowing, they would sail down the Nile to Koptos: a journey which he claims took 12 days and was 309 Roman miles long (457 kilometres). At face value, this would be an average travel time of about 38 kilometres per day: a very modest speed with a favourable wind (although with opposing currents).[11] However, as the crow flies, the distance between Alexandria and Koptos (Qift) is in fact about 640 kilometres, and Rougé has noted that the actual distance travelled would be about 850 kilometres—hence a travel time of 71 kilometres per day.[12] Pliny may have been in error about the distance, but this does not necessarily mean the travelling time was incorrect. Agatharchides claimed that it was possible to sail from Alexandria to Ethiopia (further south than the Thebaid) in ten days, while a study of papyri by Duncan-Jones reveals that the news of Galba's accession reached the Thebaid about 14 days after it had reached Alexandria.[13]

In some instances, it may have been possible to sail with cargo on barges from Alexandria to Koptos in about two weeks. But it should not be assumed that this was always the case. Cooper has noted that the period from February to June was difficult for sailing on the Nile, due to the low levels of the water—inconveniently, the months leading up to the key departure date from the Red Sea ports in July (see below). Also, a study of medieval and early modern documents for Nile travel between Cairo and Qus (near ancient Koptos) suggests a three-week journey was the norm.[14] These natural factors were not the only issues faced by merchants; bureaucratic delay and corruption by officials could also be a hindrance. A number of Egyptian papyri reveal that bribes might need to be paid to officials for quick release.[15] One could speculate, however, that large-scale commercial operations backed by powerful financiers were less likely to suffer at the hands of petty officials.

Koptos acted as the main emporium connecting the Nile to the Red Sea ports, as indicated by both Strabo and Pliny.[16] This is also apparent from the

11 Pliny *NH* 6.26.102. For Nile sailing conditions see Curtin (1984): 97; and Cooper (2011).

12 Rougé (1986): 47.

13 Agatharchides 5.67a + b = (a) Photius, Cod. 250.66, 454b–455a = (b) Diod. Sic. 3.34.7; Duncan-Jones (1990): 6–9, 25; *OGIS* 669; *O. Bodl.* 604; *W. O.* 1399.

14 Cooper (2011): 194–206; see also Duncan-Jones (1990): 13–14; Rougé (1986): 44–47.

15 Lewis (1983): 141–142: *SB* 8072 (tax-collectors wishing to be bribed); *P. Oxy.* 36 (delays caused by customs searches); Ps.-Quintilian *Declamations* 359 (right of confiscation). See also van Niff (2008): 289–290. Duncan-Jones (1990): 8, notes a governor's edict sent from Alexandria could take two months to reach the south.

16 Strabo 17.1.45; Pliny *NH* 6.26.102–103.

Muziris Papyrus, which states that a public customs house was located at Koptos, and from the Koptos Tariff inscription (dated to 90 CE), which set outs the tolls charged for people and animals crossing the Eastern Desert.[17] From Koptos, merchants travelling to the port of Myos Hormos could expect to take six to seven days, according to Strabo, while Pliny states that the journey between Koptos and Berenike would take 12 days.[18] Maxfield, consulting contemporary Bedouin accounts and the British Army Camel Corps training manual, notes that a laden camel could travel 24 to 32 kilometres comfortably in six to eight hours per day. On this basis, both Strabo's and Pliny's estimates appear realistic, since these averages suggest a journey from Koptos to Berenike would take 12–16 days (380 kilometres), and five to seven days for Myos Hormos (173 kilometres).[19]

Those travelling from Koptos to the Red Sea ports might face the problem of banditry. The Krokodilo ostraka amply attest to the potential threat posed by the nomadic inhabitants of the Eastern Desert during the reigns of Trajan and Hadrian.[20] It is also clear from the Koptos Tariff, Muziris Papyrus, and Berenike customs passes that paying tolls and obtaining permission to cross the Eastern Desert was a necessary step for merchants and travellers. The amount of delay these requirements may have generated is difficult to estimate.[21] The threat presented by bandits and nomads in the Eastern Desert may also have encouraged some merchants to wait until they could travel in larger groups for protection.[22] Thus, while the actual crossing to one of the Red Sea ports may have taken a week or two, the time taken to actually to get from Koptos to Myos Hormos or Berenike could have been longer.

Alternative Routes in the Eastern Desert and the Red Sea

It is worth taking a brief digression to consider the evidence for other routes connecting the Nile with the Red Sea. The routes between Koptos and Myos

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17 *P. Vindob.* G 40822 recto, col. 2.4–9 (Muziris Papyrus); *OGIS* 674 = *IGRR* I. 1183 (Koptos Tariff).

18 Strabo 17.1.45: Pliny *NH* 6.26.102–103.

19 Maxfield (1996): 11–12.

20 For these documents see Cuvigny (2005).

21 Muziris Papyrus: see notably *P. Vindob* G 408222 v., col. 2, ll. 1–29; r., col. 2, ll. 3–11. Koptos Tariff—*OGIS* 674 = *IGRR* I. 1183; *O. Ber.* 1–106. For further discussion of the granting of permissions to let people pass through the Eastern Desert see Cuvigny (2012d): 117–121.

22 For references to *dekanoi*—caravan leaders—see *O. Ber.* 205, 206, 212—Bagnall, Helms and Verhoogt (2005): 87–88, 91–92. See also Ast and Bagnall (2016): 24–29. Additionally, see Cuvigny (2012c): 57–80.

Hormos and Berenike were by far the most important during the early Roman period, both being a legacy of the late Ptolemaic period and a logical terminus for monitoring the merchants and preventing smuggling. Nevertheless, there is evidence for other routes connecting major Nile centres with ports of the Red Sea. These Nile centres include Dendera (Tentyris), Qena (Kainopolis), Aswan (Syene), and the already mentioned Edfu (Apollonopolis Magna).[23] The route from Qena led to the port of Abu Sha'ar (a route that also intersected with the Via Nova Hadriana near Abu Sha'ar al-Qibli), in the north of the Eastern Desert. A significant amount of traffic coming and going from Qena related to the quarrying activity at Mons Claudianus and Mons Porphyrites (particularly in the second century CE). However, a smaller station at Abu Sha'ar el-Qibli (around 4.5–5 kilometres west of the larger Tetrarchic fort) appears to be connected to the Qena route from at least the second century CE, raising the possibility of some kind of Nile-Red Sea commercial activity.[24] The routes from Edfu were used mostly in the Ptolemaic period, but an inscription at the Paneion (el-Kanais) referring to a Severus, son of Moschion, a *naukleros*, also indicates some use in the Roman period. This is not least because Marsa Nakari (Nechesia?) was connected to Edfu and this port continued in use during the Principate and into the Late Antiquity.[25]

The classical sources mention a number of ports that were established along the Red Sea coast. Sometimes they agree in detail, but at other times they provide contradictory and confusing statements. For example, there is some debate as to whether Clysma, Cleopatris, and Arsinoe are different names for the same port or refer to different sites. Cohen makes the case for the latter view, since they are recorded as such in the Peutinger Table.[26] However, this position is not universally shared, with many identifying Arsinoe with Clysma.[27] More confusion arises from the fact that some ports share names but have different epithets, such as Arsinoe near Deire and Arsinoe Trogodytica.[28]

Claudius Ptolemy mentions six major ports along the Red Sea coast. These are Arsinoe, Myos Hormos, Philoteras, Leucos Limen, Nechesia, and Bere-

23 Sidebotham, Hense, and Nouwens (2008): 37, 42.

24 Sidebotham, Zitterkopf, and Riley (1991): 571–622; Sidebotham, Hense, and Nouwens (2008): 53–60.

25 *I. Pan.* 57. See Chapter 2.

26 In one case Strabo refers to Arsinoe and Cleopatris as the same site, in another he differentiates between them (16.4.23, 17.1.25–26); *Tabula Peutingeriana* 8.4. Cohen (2006): 308, argues they are different sites; *contra* Sidebotham (2011a): 178.

27 Ward (2007): 162; Sidebotham (2015b): 132–133.

28 Cohen (2006): 310.

nike.[29] There are some discrepancies with the earlier accounts of Strabo and Pliny, since these two authors do not mention Leucos Limen.[30] The fact that Claudius Ptolemy mentions these ports suggests that they must have functioned in some capacity during the Principate, even if only in a subsidiary role to Myos Hormos and Berenike. It is possible that they partially functioned as safe anchorages for vessels caught in rough conditions, or as settlements for fishermen. Most of these ports, when located, have only revealed a limited amount of archaeological evidence. Little is known of Philoteras other than the fact that it was a Ptolemaic foundation, possibly established by Satyros.[31] However, the ostrakon mentioning Pukubis the *Ichthyophagos*, who sought to move his fishing boat to Philoteras, confirms Claudius Ptolemy's report that the port was still active in the Roman period.[32] The port of Nechesia has tentatively been identified with Marsa Nakari as a result of the discovery of early and late Roman pottery, as well as coins.[33] Also, a little Ptolemaic material has been found, including a terra-cotta oil lamp.[34]

The city of Antinopolis (modern Sheik ʿIbada) was founded by Hadrian and was connected by the Via Nova Hadriana to ports along the Red Sea coast, as far down as Berenike. This road consisted mainly of gravel and had some cairns marking its course. There is a dedicatory inscription, which mentions the plentiful wells, stations, and guard posts. There is currently little evidence for fortified stations along the east-west portion of the route running from Antinopolis to the coast, though some have been identified on the part of the route paralleling the coast.[35] It has been debated whether this route was intended for civilian or administrative use, especially since much of the road runs along the Red Sea coast.[36] If Hadrian had intended it to be another route for merchants, there is little evidence as yet to suggest it was regularly used for that purpose.

An alternative to travelling by land was the canal known as the Amnis Traianus which ran from the Nile at Babylon (south of Old Cairo) and along the

29 Ptolemy *Geog.* 4.5.

30 Sidebotham (1986): 49; Strabo 16.4.5; Pliny *NH* 6.33.168.

31 Sidebotham (1986): 50; Peacock (1993): 226–232; Jackson (2002): 80; Cohen (2006): 339; Strabo 16.4.5; Pliny *NH* 6.33.168; Ptolemy *Geog.* 4.5.14.

32 R. Thomas (2007): 151—Ostrakon 0512.

33 Seeger (2001): 79–85; Seeger and Sidebotham (2005): 18–20; Tomber (2008): 65.

34 Sidebotham (1999c): 365; Sidebotham, Hense, and Nouwens (2008): 166; Sidebotham (2015b): 150.

35 Sidebotham and Zitterkopf (1997): 221–237; Sidebotham and Zitterkopf (1998): 353–365; Sidebotham, Zitterkopf, and Helms (2000): 115–126.

36 Young (2001): 78–79 (civilian use); Sidebotham and Zitterkopf (1997): 226; Sidebotham and Zitterkopf (1998): 354 (administrative use).

Wadi Tumilat to the port of Clysma at the head of the Heroopoliticus Sinus (Gulf of Suez).[37] It had been established, or re-dug, on the route of earlier canals at least by 112 CE, and was financed by a special tax levied in Upper Egypt (and possibly elsewhere in the province). The project was potentially undertaken in connection to Trajan's planned campaign against Arabia and Persia.[38] Classical sources mention the existence of a canal along the Wadi Tumilat dating back to the Pharaonic period, with Sesostris (XII Dynasty) and, alternatively, Necho II (XXVI Dynasty) being credited with its conception.[39] It is claimed that Darius I restored it, followed by Ptolemy II—seemingly confirmed, in the latter case, by the Pithom stele (270/269 BCE), which states that the canal was connected to the port of Arsinoe.[40]

When Trajan created or restored this canal, he established facilities at the Nile site of Babylon, which was later fortified by Diocletian.[41] In the second century CE, both Claudius Ptolemy and Lucian make reference to Clysma. The latter relates the account of a young man who had sailed from Alexandria as far as Clysma and was persuaded, out of a sense of adventure, to join a ship departing for India.[42] The frequency with which ships departed from this port is difficult to know, but the prevailing northerly winds made travel up the Red Sea difficult. Consequently, Clysma's position was not favourable for receiving imports.[43] Some have suggested that the canal was used for transporting exports, especially bulky goods, while imported goods were sent via Berenike.[44] This is a possibility, but archaeological and written evidence shows that the port was mainly in use from the fourth to mid-seventh centuries CE. Perhaps the route

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37 Posener (1938): 259–273; Mayerson (1996): 119; Sheehan (1996): 95.

38 On the date see, *SB* VI 9545; Aubert (2015): 35; Nappo (2015): 64–65.

39 Arist. *Mete.* 1.14.20–28; Strabo 17.1.25–26; Pliny *NH* 6.33.165 (Sesostris); Hdt. 2.158–159; Diod. Sic. 1.33.7–12 (Necho II).

40 Cohen (2006): 308; Sidebotham (2011a): 179; Smith (2009): 50–51. Possibly also reworked/maintained under Augustus/Tiberius—Sidebotham (2015b): 135.

41 Jeffreys (2008): 7.

42 Ptolemy *Geog.* 4.5; Lucian *Alexander the False Prophet* 44. By way of comparison Plutarch (*Moralia* 410A–B) reports on a Cleombrotus the Spartan who wandered across Egypt and Trogodytica, and travelled beyond the Red Sea for sight-seeing and learning (83/84 CE); Aubert (2015): 37.

43 Young (2001): 76; Aubert (2015): 40–41; *contra* Whitewright (2007b): 77–87.

44 Huntingford (1980): 5; Sidebotham (1991): 17; Sidebotham (2015b): 137–138; McLaughlin (2010): 33; McLaughlin (2014): 86; Schörle (2008): 47. Aubert (2015): 40, has expressed doubt as to whether the canal would have been regularly used for commercial traffic. For a critique of Aubert's view that transport along the canal only coincided with the Nile flood see Sidebotham (2016): 916–917.

became more important at that time because incursions further south in the Eastern Desert by groups like the Blemmyes made crossing from Koptos more difficult.[45] Indeed, the Christian pilgrim Egeria (fourth century CE), recorded by Peter the Deacon, states that in this period Clysma was the only Roman port trading with India (not strictly true, as Berenike was still in operation).[46] Its continued use is indicated by the *Martyrium of Arethas*, which states that 20 vessels were launched from Clysma during the reign of Justinian to aid the Ethiopian attack on the kingdom of Himyar (Yemen).[47]

It was not only ports on the Egyptian Red Sea coast that were in operation during this period. The Nabataean port of Leuke Kome was also important in the Indian Ocean trade. Its precise location has long been debated, but the author of the *Periplus* reveals that it was on the Arabian coast.[48] This author reported that Leuke Kome had an official receiver of the *tetarte* or quarter tax (*paralemptes tes tetartes*), who was accompanied by a centurion and detachment.[49] Some have doubted that a Roman garrison was present at a Nabataean port during the mid-first century CE, a region not annexed until the reign of Trajan. It has alternatively been proposed that this reference in the *Periplus* merely points to the adoption of the rank of centurion by the Nabataean army.[50] This seems unconvincing. Nabataean Arabia was very much a vassal state and not in a position to refuse a Roman garrison. It would, in fact, make sense for the Roman state to ensure that merchants paid the *tetarte* and could not bypass this tax by unloading their goods at Leuke Kome.[51] In any case, the author of the *Periplus* makes it clear that only small craft coming up from Arabia frequented this port.[52]

45 For discussion of the period of occupation at Clysma see Mayerson (1996): 120; Young (2001): 77; Ward (2007): 161. For the increasing problems caused by the Blemmyes see *SHA Probus* 17.2.6; Zosimus 1.71.1; *De XII Gemmis*, 19–21 = Eide et al. 1998, no. 305; Cosmas *Christian Topography* 11.339.

46 Petr. Diac. *Liber de Locis Sanctis* CCSL, vol. 175, 101; Cohen (2006): 327, 329 n. 6; Nappo (2009): 72.

47 Mayerson (1996): 123.

48 *Periplus* 19; Strabo 16.4.23; Schoff (1912): 101 (El Haura); Casson (1989): 143–144; Sidebotham (1991): 21; Young (2001): 94 (Khuraybah-Aynūnah); Cuvigny (2006a): 28–29; Nappo (2010): 335–342 (al-Wajh).

49 *Periplus* 19.

50 Casson (1989): 145; Bowersock (1983): 71 (Centurion rank transliterated to *qnṭryn'*—*CIS* II. 217).

51 Rostovtzeff (1957): 576–577 n. 18; Raschke (1978): 664; Young (2001): 96; McLaughlin (2010): 64; Villeneuve (2007): 16; Speidel (2015): 103; Ast and Bagnall (2015): 179–180.

52 *Periplus* 19.

From the Red Sea Ports to Adulis

Returning to the main discussion, once a merchant had arrived at Myos Hormos or Berenike with his cargo there were a series of different trading routes and schedules he could choose from. Those wishing to trade only along the Red Sea coast down to Adulis (Eritrea) would set out broadly between July and September with favourable north to north-westerly winds (around September, the winds start to become variable). An ideal time to return was October to February, when a south or south-eastern wind would provide a favourable journey at least up to 20° or 21° N parallel. Better yet, during March and April it was favourable up to 25° N parallel. Because of dangerous shoals in the Red Sea, a vessel would only sail during the day and would anchor towards nightfall.[53] A return trip from Myos Hormos or Berenike to Adulis would have taken around six to eight months (this does not factor in travel within Egypt along the Nile and across the Eastern Desert).

The Gulf of Aden and East Africa

The author of the *Periplus* states that merchants who wished to trade down the eastern coast of Africa should set out from the Red Sea ports during July, but, unlike those bound for India, they should not depart from Cape Guardafui (Horn of Africa) until October or November. In this way, they could exploit the Northeast Monsoon to sail down the coast of East Africa. This delay gave merchants a few months to engage in tramp trading along the coast up to the Horn of Africa.[54] Merchants who did not wish to sail beyond the Horn needed to wait till November before returning westward through the Gulf of Aden. As noted above, from December to February they could use fair winds to travel up the Red Sea to reach 20° N. Above 20° N, the prevailing winds are usually north-westerly and quite strong, with chances for a fairer wind all the way up to Berenike improving in March.[55] A return trip from the Red Sea ports would be around eight to nine months (not factoring in travel time within Egypt).

A similar sailing schedule was adopted by merchants who did not travel beyond the Gulf of Aden and the southern Arabian coast, because they wished to specialise in the incense trade. Pliny mentions that those who did not wish to sail onto India, but only to deal in the aromatics and perfumes of Arabia, would

53 Casson (1980): 26, 28 (variable winds); McGrail (2004): 53 (journey to Adulis). For Red Sea wind patterns see Whitewright (2007a): 78.

54 *Periplus* 4–12, 14; Casson (1980): 27–28.

55 McGrail (2004): 53 (better conditions in March); Sidebotham (2011a): 8 (prevailing winds above 18°/20° N).

go to the port of Muza.[56] The timing of this journey enabled these merchants to take advantage of the availability of frankincense and myrrh at these ports in November and December (a tapping taking place around August to October), while another harvest was available in around January to March.[57] Roman vessels would return after the one or both of these harvests, reaching the Red Sea ports by late March, if not earlier. Large numbers of vesicular basalt rocks from Southern Arabia have been found at Myos Hormos and Berenike, which quite likely attest to this specialised trade. This is because those trading in aromatics may not have been able to acquire sufficient ballast goods at the Arabian ports for their return journey.[58]

Those willing to undertake a journey around the Horn and down the East African coast had to wait until the autumnal transition (around October) had brought on the Northeast Monsoon. This would provide a fair wind for travelling southwards. The furthest port down the African coast mentioned in the *Periplus* was Rhapta (near Dar es Salaam?).[59] Favourable winds and currents meant a merchant vessel could reach Rhapta by November, depending upon the amount of time spent tramp trading along the coast.[60] It was necessary, however, to reach the port before the spring transition (end of April to May) brought on the beginning of the Southwest Monsoon.[61] From May or June to September it would be possible to sail up the eastern coast of Africa, but not to round the Horn until the autumnal change of the monsoons. The Northeast Monsoon could then be used to travel up the Gulf of Aden into the Red Sea.[62] This journey could take a year and a half to 21 months to complete, giving only a few months to discharge the imported goods and assemble a new cargo for the next two-year trade venture.[63]

56 Pliny *NH* 6.26.104.

57 Groom (1981): 144–148, 233; Hull (2008): 282; Pliny *NH* 12.35.68.

58 For the use of these rocks as ballast see Peacock, Williams, and James (2007): 28–70; Sidebotham (2011a): 205, 236; Sidebotham and Zych (2012b): 139. Southern Arabian merchants carried merchandise to Aila in a 70 day journey—Strabo 16.4.4.

59 *Periplus* 16; see also Ptolemy *Geog.* 4.7.12. Rhapta's location is contested; suggestions have ranged from somewhere along or near the coastline of modern Tanzania (Dar es Salaam, Pangani, Rufiji Delta) to a site on the island of Zanzibar or Pemba—Kirwan (1986): 99–104; Casson (1989): 141–142. More recently Hughes and Post have made a strong case for locating Rhapta near present-day Dar es Salaam—Hughes and Post (2016): 135–153.

60 Casson (1980): 29.

61 McGrail (2004): 53; see the wind chart in Casson (1980): 26; also the departure table in Casson (1989): 15.

62 Casson (1980): 29–32; McGrail (2004): 53.

63 A year and a half estimate—Casson (1980): 29; a 21 month estimate—McGrail (2004): 53.

It has been questioned whether Roman traders would frequently travel beyond the Horn. Seland has argued that the author of *Periplus* was relying on second-hand information for this area rather than direct experience, with De Romanis suggesting that this derived from Arab sailors.[64] It has also been noted that Ptolemy only named two Roman mariners who had explored the coast as far as Rhapta, one of whom had been accidentally blown off course.[65] Given the comparative paucity of Roman finds down the coast of East Africa, this scepticism appears warranted. Indeed, some of this limited evidence has even been subject to challenge. Chami's suggestion that some beads found on Mafia Island and at Kilwa (Tanzania) may be Graeco-Roman (c. 100 BCE–200 CE) has not found favour with others who propose a late first millennium CE date instead.[66]

To India and Back

The author of the *Periplus*, however, clearly does describe from first-hand experience voyages to the western coast of India. He asserts that ships would depart from the Red Sea ports in July, the Egyptian month of Epeiph, a statement supported by Pliny's comment that merchants set out before the rising of the Dog Star (Sirius)—that is to say, mid to late July.[67] Prevailing north-westerly winds allowed for a fairly quick voyage down the Red Sea and into the Gulf of Aden.[68] Pliny further reports that vessels departing from the Red Sea ports could make it to Ocelis or Kane in 30 days.[69] These ports were about 300 kilometres apart, suggesting that this figure did not necessarily denote the length of the voyage so much as a suggested arrival time (with possible stops at preceding ports).[70] Having reached the Gulf of Aden, the author of the *Periplus* reports that ships might depart from Kane or Cape Guardafi.[71] In addition, Pliny states that those sailing for Patala (near the Indus Delta) set out from Syagrus (Ras Fartak) with a southwest wind, while those heading to Muziris in southern India would depart from Ocelis (location unknown, though definitely in southern Arabia).[72]

64 Seland (2010): 15; De Romanis (2016): 101–103.
65 McLaughlin (2010): 69; McLaughlin (2014): 126–127; Ptolemy *Geog.* 1.9.
66 Chami (2000): 211; see also Sinclair (2007): 148. *Contra* Helm et al. (2012): 40, 58–59.
67 *Periplus* 39, 49, 56; Pliny *NH* 6.26.104, 18.68.268–271. See Hannah (2005): 24, 26.
68 Casson (1980): 31; Whitewright (2007a): 78–81.
69 Pliny *NH* 6.26.104.
70 Casson (1980): 32–33; Cobb (2014): 99.
71 *Periplus* 57.
72 Pliny *NH* 6.26.104.

Pliny claims that the voyage from Ocelis to Muziris would take 40 days. The veracity of this has been doubted by some, since this would equate to a moderately slow speed of two knots per hour.[73] Pliny may not necessarily have been in error, and it is likely that the time taken varied from the point of departure and the direction of sail. Later Islamic evidence suggests voyages from the southern Arabian Peninsula to India could vary from two weeks up to a month.[74] Whatever the case, the most important thing for Roman merchants was to reach the western coast of India by the latter half of September. An early arrival could spell disaster due to the rough conditions along the shores in August, while a late arrival might mean getting buffeted by the winds arising from the transition to the Northeast Monsoon (October to November).[75] Indeed, delay or error could cause merchants to miss a season. The author of the *Periplus* noted that vessels from Barygaza and Limyrikē (Malabar) that were too late to catch the end of the Southwest Monsoon back to India had to winter at Moscha Limen (Khor Rori, in Oman) until spring.[76]

Arriving at the end of September, this left merchants about two to three months to exchange all or part of their cargo. Quite possibly parts of their original consignment had been exchanged in East African or Arabian ports, either to be held onto until arrival back at Alexandria or to be exchanged in India. That such a practice took place is implicit in statements in the *Periplus*, where the author alludes to the potential to exchange goods which are unlikely to have originated from the Mediterranean world. For example, he mentions that there was a market for frankincense in the Barbarikon and one for Arabian wine at Barygaza.[77] It is possible that this detail was mentioned incidentally, but it is quite likely that some Roman merchants traded goods acquired at southern Arabian ports in India. In any case, the process of exchanging cargo for the desired goods could be greatly facilitated for those who had agents or associates residing at Indian ports (see below). Prices or barter values could have been negotiated in advance, agreements struck, and goods assembled in preparation for the arrival of their fellow agents, colleagues, or patrons.

Pliny reports that merchants returning from India set sail around the beginning of the Egyptian month of Tybi (Roman December), or at least before the

73 Pliny *NH* 6.26.99–105; Casson (1980): 33 (an error on Pliny's part); Robert (1997): 254 (Pliny inadvertently included stopping time at the ports along the Gulf of Aden).

74 Cobb (2014): 99–101.

75 Casson (1980): 34; Düing (1970): 12, 14, 21.

76 *Periplus* 32; see also Casson (1989): 172–173.

77 *Periplus* 39, 49.

sixth day of Mechir, the Roman Ides of January (13th).[78] This was in order to take advantage of the Northeast Monsoon, which lasted from November to April.[79] The winds were also favourable at this time for sailing up the Gulf of Aden, and, as noted above, to reach Berenike or Myos Hormos around February to March with the aid of the southerlies in the lower portions of the Red Sea.[80] That this was a typical time for arriving at the Red Sea ports and crossing the Eastern Desert is suggested by the Latin graffito of Gaius Numidius Eros written in a cave in Wadi Menih on the Koptos-Myos Hormos road. This graffito records his return from India in the month of Phamenoth in the 28th year of Caesar—February or March in 2 BCE.[81] However, the papyrus *P.CtYBR inv. 624* indicates that some ships might arrive late and, as a result, get into difficulties. The document details how a group of ships struggled for five hours to sail into Berenike's harbour against foul winds (during the reign of Nerva on Pauni 11, or June 5, 97 CE).[82] By comparison with the Mesopotamian-Persian Gulf route, a Palmyrene inscription reveals that merchants returning from India on the ship of Haniano, son of Haddoudan, arrived back into Palmyra in March (157 CE).[83] This meant that Indian Ocean goods could reach major ports on the coast of the Eastern Mediterranean, like Antioch, in late spring (April to May).[84]

78 On these see De Romanis (2014): 86–89 (dates reflect a source Pliny used c. 49–52 CE); and Desanges (2012): 68 (Pliny miscalculated, it should be January 31st or February 1st for the last departure date).

79 Pliny *NH* 6.26.99–105—he mistakenly refers to the monsoon as south-western instead of north-eastern.

80 Cobb (2014): 101. A few seventeenth and eighteenth century inscriptions from Socotra indicate it took Gujarati merchants around 50 days to reach the island—Shelat (2012).

81 Winkler (1938): 1, pl. VIII. De Romanis (2014): 86, argues that Eros' arrival back at this time implies he left India in early December.

82 *P.CtYBR* inv. 624: see Peppard (2009). In this region of the Red Sea Berenike was the safest location for a few hundred kilometres, offering protection against the shore currents, but not the northerly winds—Rądkowska and Woźniak (2011): 19.

83 Inv. X 96—Seland (2011): 398–399.

84 Seland (2011): 405. Tomber suggests that the range of materials coming via this route likely also differed to a certain degree from those coming via the Red Sea route—Tomber (2017): 547. See also Graf (2017): 494–495. There is certainly some validity to this view, especially in light of the strong connections between northwest India and the Persian Gulf (see *Periplus* 35–36, among other evidence), but there was a degree of overlap as well as (see Chapter 5).

The Return to Alexandria

Having returned to either Myos Hormos or Berenike, the merchants would need to make the one-or-two-week crossing of the Eastern Desert. But just as the eastward journey from Koptos entailed dealing with issues of taxation and making arrangements vis-à-vis security, such concerns also faced those travelling westward. The Muziris Papyrus makes this clear in respect of both taxation and security. The imported goods needed to be assessed upon their arrival so that no evasion could take place before the *tetarte* was collected at Alexandria. Certainly, this process of assessment must have taken some time. As noted in Chapter 4, the Muziris Papyrus also stipulates an explicit obligation to arrange for security to accompany the camel train, which suggests some may have planned this in advance. However, many may have organised security upon arrival. It is possible to infer that settling such arrangements would cause a degree of delay, though it is not possible to discern to what degree.

Once at Koptos, the process of loading goods onto river boats for the journey down the Nile to Alexandria would begin. As noted above, the journey up the Nile could take ten to 14 days, judging from the evidence of Agatharchides, Pliny, and records relating to Galba's accession. However, it was also noted that February to June was not an ideal time of year to sail on the Nile, due to the low levels of the river. The legal edict granting individuals 50 days to reach Alexandria from the Thebaid may have taken account of such sessional issues. By way of comparison, the loan contract dealing with the venture to the Spice-Bearing Land stipulated that somewhere around 50 to 90 days were granted to encompass the journey from one of the Red Sea ports back to Alexandria (some of this time would be allocated to selling the goods).[85] Consequently, if a merchant arrived at one of the Red Sea ports in February or March, they might, under favourable conditions, reach Alexandria with their goods around March or April, but it is certainly possible that a significant volume of goods arrived in the mid-summer period, when the inundation facilitated Nile transport.[86]

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85 *SB* III 7169—De Romanis (2014): 76.

86 Cooper (2011): 194–206; Seland (2011): 404–406; Seland (2016a): 57–61; Cobb (2014): 102. See Table 4.

TABLE 4 *Range of travelling times*

Stages	Red Sea	Gulf of Aden	East Africa	India
Italy to Alexandria		**Faster estimate:** Depart: mid-April. Arrive: late-April (eight days). **Slower estimate:** Depart: mid-March (more risky). Arrive: mid-May (nine weeks).		
Alexandria to Koptos		**Faster estimate:** Arrive: early-mid May (10–14 days). **Slower estimate:** Arrive: early-mid July (a month or two).		
Koptos to Red Sea ports		**Faster estimate:** Arrive: mid-late May (5–12 days). **Slower estimate:** Arrive: mid-late July (5–12 days, but potential delays).		
Voyage to Adulis	Set out around July to September.			
Voyage to the Gulf of Aden		Depart: mid-July. Arrive: mid-August (30 days).		
Voyage beyond the Horn, down East African coast			Depart: mid-July. Leave from Cape Guardafui (Horn of Africa) around October—reach Rhapta by November.	
Voyage to India				Depart: mid-July Arrive: late-September.

<table>
<tr><th>Stages</th><th>Red Sea</th><th>Gulf of Aden</th><th>East Africa</th><th>India</th></tr>
<tr><td>Return to the Red Sea ports</td><td>Faster estimate:
Start return journey around October to February.
Slower estimate:
Start return journey around March–April.</td><td>Return around February if departing after the first harvest.
Return around March–April if departing after the second harvest.</td><td>Possible to sail back up coast around May/June to September.
Round the Horn during the autumnal change of the monsoons.
Use Northeast Monsoon to sail through the Gulf of Aden and Red Sea, arriving back around February–April.</td><td>Faster estimate:
Arrive: February (graffito of Gaius Numidius Eros).
Slower estimate:
Arrive: June (P.CtYBR inv. 624).</td></tr>
<tr><td>Red Sea ports to Koptos</td><td colspan="4">Faster estimate:
Arrive: mid-February (5–12 days).
Slower estimate:
Arrive: mid-June (5–12 days, but potential delays).</td></tr>
<tr><td>Koptos to Alexandria</td><td colspan="4">Faster estimate:
Arrive: early-March (10–14 days).
Slower estimate:
Arrive: mid-August (50 days).</td></tr>
<tr><td>Alexandria back to Italy</td><td colspan="4">Faster estimate:
Depart: mid-march (riskier) or mid-April (preferable);
Arrive: mid-April (riskier) or mid-May (preferable): (30 days, but in most cases clearly longer).
Slower estimate:
Depart: mid-Augustus;
Arrive: mid-November (any later and vessels would be sailing during mare clausum): (two to three months).</td></tr>
</table>

TABLE 4 *Range of travelling times* (cont.)

Stages	Red Sea	Gulf of Aden	East Africa	India
Estimated duration of voyage/transit	**Faster estimate:** 12–13 months if one sets out in mid-April or *9 months* if one sets out around mid-July (for September departure from the Red Sea) **Slower estimate:** 20 months	**Faster estimate:** 12–13 months (Within 12 months is possible if one starts the journey in mid-May). **Slower estimate:** 20 months	**Faster estimate:** 2 years **Slower estimate:** 28 months	**Faster estimate:** 12–13 months (within 12 months is possible if one starts the journey in mid-May). **Slower estimate:** 20 months

The Egypt-Indian Ocean Circuit

Assessing the routes and schedules for journeys from Alexandria to East Africa, the southern Arabian Peninsula, and the western coast of India, it appears a round circuit could be completed within a year (with the notable exception of voyages down the East African coast beyond the Horn). Under optimistic conditions, it might be possible to travel from Alexandria to one of the Red Sea ports in 15 to 26 days, though this assumes there were not too many delays caused by bureaucracy, corruption, or issues with security. Theoretically, a merchant might be able to set out in June and manage to make the important mid-July departure date for voyages to India. However, it is likely that some of the wealthy investors and merchants had agents engaged in organising the transport of goods to the Red Sea ports throughout the year, warehousing them until they needed to be loaded into a ship's cargo hold. This might be inferred from the evidence showing the delivery of goods to the ports throughout the year, and not only around the June to July period.[87] As Adams has cogently argued, it is not necessary to assume that goods brought in other periods were

87 See for example, *O. Petr*. 224 (October—wine (two types), wheat, bread); *O. Petr*. 224 (August—drugs); *O. Petr*. 238 (December—wine); *O. Petr*. 244 (November—drugs or dyes); *O. Petr*. 264 (September—pouches or wallets of purple dye or cloth); *O. Petr*. 275 (May—drugs); *O. Petr*. 287 (January—wine); *O. Petr*. 290 (July—bread, wine, silver money and plate, ox-hide).

supplies rather than trade goods, as even the transport of small quantities of items may simply reflect a camel's carrying capacity.[88]

As has been shown, once in the Gulf of Aden ships sailing to India would depart from ports in this region around mid to late August in order to arrive on the western coast of India by late September. They would start the return voyage around December or early January and, along with ships which remained in ports along the East African coast or southern Arabian coast, would make their way north up the Red Sea with favourable southerlies around February to March. Again, with an optimistic 15- to 26-day crossing of the Eastern Desert and voyage down the Nile, a merchant might have reached Alexandria in early March or April. However, issues with bureaucracy, corruption, security, and the low water level of the Nile between February and June may have meant that many did not arrive with their goods until the June to August period.[89] This roughly works out to a year's turnaround and accords with Pliny's explicit statement that roundtrips between Alexandria and India could be accomplished within a year.[90]

Mediterranean Integration

Alexandria, by virtue of its integration into Indian Ocean trade networks as well as its vital role in Mediterranean trade, acted as a linchpin connecting these two spheres together. Indian Ocean goods were acquired each year in the markets at Alexandria to be distributed throughout the Mediterranean, while goods produced in the Roman Empire were collated at Alexandria to be exported to East Africa, Arabia, India and beyond. The rhythms and seasons of trade between these two spheres were, of course, different—an obvious point, but one that has implications both for the idea of vertical integration and for the extent to which central and Western Mediterranean goods were available in Alexandria for export to India. If Italian financiers and merchants did play a prominent role in the Indian Ocean trade and were engaged in vertical integration, they would not be able to achieve a circuitous flow of goods between Italy and India within one year. Essentially, a return on an initial investment would take well over a year to achieve; therefore, these merchants or financiers are likely to have been in the position of needing to fund the following year's investment, not from the

88 Adams (2007): 224–225; see also Wendrich et al. (2003): 80–81. Indeed, when such goods are intended as provisions they are explicitly referred to as such—for example, *O. Petr.* 227.

89 See Cobb (2014): 104–107. See Table 4.

90 Pliny *NH* 6.26.106.

proceeds of the preceding year (which had not yet been recouped) but from the year before that, or from pre-existing resources.

This can be demonstrated by considering a hypothetical circuitous exchange between Italy and India. Vegetius reports that the safest sailing period in the Mediterranean was between June and mid-September, although it was possible to sail in the riskier mid-March to mid-May and mid-September to mid-November periods; mid-November to mid-March was *mare clausum*.[91] Vessels wintering in Italy might depart for Alexandria in spring, but by summer they could take advantage of the prevailing northerlies to reach Messina, at the northeast tip of Sicily, and then speedily sail to Alexandria over the open sea with a favourable wind on the stern.[92] Pliny reports the impressive speeds with which two Egyptian prefects had been able to reach Alexandria: Galerius reaching the city in five days from the Strait of Sicily, Balbillus in six. It is also reported that Valerius Marianus sailed from Puteoli to Alexandria in eight days.[93] These voyages were comparatively quite fast at an average speed of six knots.[94]

Duncan-Jones' study of first- and second-century documents from Egypt relaying news of the death or accession of emperors, suggests that such reports could take 50 to 60 days on average to reach the province, although news of the accession of Galba reached Alexandria at least 27 days (July 6) after Nero's death (June 9). Of course, such averages may be skewed by the available sample of documents and factors, such as the time of year when an emperor died or ascended. Nevertheless, medieval evidence shows that, on average, fast merchant vessels sailing from Palermo (northern coast of Sicily) to Alexandria could take 17 days for a good journey, while a bad one might take 35 days.[95] Both the ancient and the medieval evidence would suggest that the norm was three to four weeks of sailing from Italy to Alexandria. It has been noted above that

91 Vegetius *Epitoma rei militaris* 4.39—The 'safe season' is six days before the Kalends of June (May, 27) till 18 days before the Kalends of October (September, 14); the 'risky seasons' are from after the 14th of September until three days before the Ides of November (November, 11), and from the 10th of March until the Ides of May (May, 15); the 'closed season' is from the 11th of November until the six days before the Ides of March (March, 10)—see Milner (1993).

92 Casson (1950): 51; Casson (1974): 150–152; Duncan-Jones (1990): 16–17; McGrail (2004): 93. On the dangers of winter sailing—Philo *In Flacc.* 125; *On the Virtues* 49; for sailing speeds see Casson (1971): 281–299.

93 Pliny *NH* 19.1.1.

94 1000 nautical miles/(6 knots × 24 hr) = about seven days.

95 Duncan-Jones (1990): 6–9, 11, 16–17, 25; Goitein (1967): 324 (Geniza documents); Cobb (2014): 94–95.

under favourable conditions those setting out from Alexandria could reach the Red Sea ports in June, leaving a fair amount of time before the vital mid-July departure date for India. Therefore, families such as the Peticii (as Tchernia has advocated) could try and send their wines to Alexandria in early May, a little before the ideal sailing season began, and hope that a three- to four-week voyage would ensure their arrival in Alexandria for June (to then be transported down the Nile and across the Eastern Desert). This, however, relies on ideal travelling conditions in the Mediterranean.

To turn to the return journey, it has been shown above that due to the low water level of the Nile between February and early June it would have been easier for imports from the Indian Ocean to reach the markets in Alexandria around mid-summer (June to August), but some may have arrived around March to April under favourable conditions. It was *mare clausum* until mid-March, but for the purposes of this theoretical exercise, let it be assumed that the agents of the Peticii were willing to ship these imports to Puteoli or Rome in the risky mid to late March period instead of waiting a few months. Unlike the journey from Italy to Alexandria, the journey for those wanting to sail from Alexandria to Puteoli or Rome was two to three times as long. Casson's study of Lucian's *Navigium* and Saint Paul's description of his journey to Rome has demonstrated that merchants could not take a direct route when sailing to Rome from Alexandria or the Levant. They would need to sail via Asia Minor, Crete, Malta, and the Strait of Sicily, and from there sail north-north-west to reach Puteoli or Ostia, unless they chose to wait at Rhegium for a southerly breeze. The whole journey took as much as two to three months.[96] By comparison, medieval evidence shows that voyages between Alexandria and Venice would take, on average, 65 days.[97]

If the Peticii's agents set out in mid-March, they may have been able to make it to Italy in mid-May or mid-June. This falls a few weeks or a month after the departure date (early May) for that year's outbound venture (see above). Furthermore, all this was dependent on having favourable conditions the whole time and not needing any leeway. Of course, it is highly likely that a great many Indian Ocean goods arrived in August or September (with a June departure from Alexandria). Table 4 provides an outline of optimistic and pessimistic sailing times, ranging from 13 to 20 months for a circuitous exchange of goods between Italy and India. Most voyages would have fallen somewhere between

96 Casson (1950); Casson (1971): 271–272. Of relevance here is Caesar's report that he was unable to leave Alexandria due to the 'Etesian winds' (*Commentarii de Bello Civili* 3.107).

97 Duncan-Jones (1990): 23–25—those from Jaffa to Venice 89 days on average.

the two.[98] This exercise is not intended to dismiss the idea that Italian merchants and financiers were involved in the trade. It does, however, demonstrate the advantage for merchants and financiers operating from Alexandria; barring disaster, these individuals would have been able to invest some or all of the profits made from selling their Indian Ocean goods in the city's markets in the coming season's trade venture.

The other implication of the different trading cycles operating in the Mediterranean and the western Indian Ocean is the types of goods being exchanged. There should be no doubt that goods from across the Mediterranean world were being exported to India, including goods from central and western areas, such as wines from Italy, red coral from the areas around the south coast of France and Sicily, Spanish olive oil, and possibly Spanish lead.[99] It is likely that many of these Western Mediterranean goods reached Alexandria via trading links with Rome and Campania. However, as the comments of Vegetius make clear, the safest period for sailing was around June and mid-September, and it is not unreasonable to assume that many vessels would arrive from Italy to Alexandria around the end of June, if not a little later. As has been shown, it would be inadvisable to leave from Alexandria any later than early June if one wanted to reach the Red Sea ports in time for the mid-July departure.[100]

It can only be a matter of speculation, but this may have meant fewer goods from the Western Mediterranean were available in Alexandria's markets during the period leading up to June. In order to mitigate this, some merchants or consortia may have purchased goods in advance when they were more readily available (and presumably cheaper), storing them in anticipation of the next season's venture. This practice has already been suggested above. They could arrange with others to ensure that they would supply the desired goods in time for the next sailing season, although this could sometimes go wrong. The aforementioned papyrus *P.CtYBR inv. 624* records the complaint of a merchant whose associate had failed to ensure that blankets (probably) from the Arsinoite Nome were delivered to him.[101] Such issues underline the potential complexities of this trade and the sophisticated organisation required.

98 See Cobb (2014): 105–106.

99 Pliny *NH* 32.11.21 (Red Coral); Ray (1991): 59 (Spanish lead).

100 Cobb (2014): 107–108.

101 *P.CtYBR inv. 624*.

Merchant Diasporas

The last section has shown that the rhythms of the Southwest and Northeast monsoons allowed Roman merchants around three months to conduct business in India before it was necessary to undertake the return voyage to Myos Hormos or Berenike (late September to early January). Merchants confining their activity to the Red Sea, the African coast of the Gulf of Aden, or the southern Arabian Peninsula had a little longer. Those merchants who were less wealthy and operating on their own behalf (rather than employing a series of agents or forming part of a consortium) may have simply conducted their business within this limited time frame. This will have left them more susceptible to the vagaries of the availability of goods and fluctuating prices or exchange values. However, it has been shown in Chapter 3 that some of the wealthier and more powerful financiers and merchants operated through a series of agents, and there is reason to believe that some of these agents were resident for long periods in Indian Ocean ports. This offered the opportunity to develop connections with reliable and trustworthy local merchants, acquire goods in advance for their fellow partners or agents, dispose of their cargoes after they had departed, and use their knowledge of market conditions to obtain favourable exchanges.[102] Given these advantages, it is not surprising that there is some evidence for such practices in the period under study. However, it is necessary to be cautious, since the evidence as yet does not substantiate a comparison with the more sophisticated, extensive, and well-developed diasporas that existed in later periods of Indian Ocean history.[103]

Indian and Arabian Merchants in Egypt

It has already been stressed, but it is worth repeating: merchants from the Roman Empire were not the only ones operating in the Indian Ocean, nor were they more proactive or predominant than other groups. This is particularly apparent from the evidence which shows Arabian and Indian merchants operating at the Red Sea ports and more widely in Egypt during the Principate. Indeed, as will be apparent, the evidence for these groups operating in Egypt is more solid than that for long-term Roman residents in India or Arabia.

102 See C. Meyer (1992): 70; McPherson (2007): 39; Seland (2013): 373–390; Gurukkal (2016): 192–193; Broekaert (2017): 13–15.

103 For the existence of merchant colonies and diasporas in later medieval, pre-modern and modern periods see Goitein (1954); Goitein (1967); Goitein (1980); McCabe, Harlaftis, and Minoglou (2005).

It is not surprising that Arabian merchants were present in Egypt, since they are already attested in the Ptolemaic period, as seen with Zaydʿil bin Zayd, the Minaean importer of aromatics who was buried at Memphis. In the Roman period, two dedications were set up by merchants from Aden: one during the reign of Claudius, another during that of Vespasian.[104] This is despite the statement in the *Periplus* that Caesar sacked Eudaimon Arabia (Aden)—which as we have noted may actually represent confusion on the author's part.[105] In fact, it appears the port was still functioning in the time of Claudius Ptolemy (mid-second century CE), who identifies it as a market town.[106] Both Berenike and Myos Hormos have revealed a series of South Arabian graffiti, including, in the latter case, a sherd with the South Arabian name 'Ydm' (Yadûm).[107] The site has also revealed an Indian container found in a third century CE layer with a South Arabian monogram.[108] Furthermore, the appearance of the word 'Šaqr' (the name of the royal palace at Shabwa) on jars at Berenike and Myos Hormos (as well as Qana') may imply Hadramawti connections to the Red Sea trade, and possibly the presence of the king's agents.[109] Besides graffiti, the sites of Myos Hormos and Berenike have both revealed South Arabian utilitarian and coarse wares. This includes a calcite beehive vessel found at the former port, a vessel thought to have originated in southwest Arabia. South Arabian handmade jars with everted rims and high foot bases also appear to be fairly common at Myos Hormos and Berenike.[110]

The presence of Indian merchants in Egypt is also confirmed from evidence, despite some earlier scholars (and even some recent ones) presenting Roman merchants as predominant in the transit of goods in the Indian Ocean, with others taking a more passive or subordinate role. As noted in Chapter 1, McLaughlin has suggested that some Arabians and Indians who lacked their own vessels chartered space aboard Roman ships, while Gurukkal doubts whether South Indian polities lacked the sophisticated organisational structures and technology needed to engage in direct trade.[111] Contrary to these argu-

104 Fournet (2006): 429—*I.Portes* 62, (Athenion of Aden)—*I.Portes* 91 (Hermeros of Aden).
105 *Periplus* 16.
106 Ptolemy *Geog*. 6.7.
107 Bagnall et al. (1979): 244–245; Sidebotham and Zych (2010): 12; Sidebotham and Zych (2011b): 39.
108 Tomber (2004): 352–353.
109 On these finds see Sidebotham and Zych (2011b): 56–57; Sidebotham and Zych (2012b): 138.
110 Johnson (1982b): 327; Tomber (2004): 351–353; Sidebotham and Zych (2011b): 41.
111 McLaughlin (2010): 39; Gurukkal (2013): 181–206; Gurukkal (2016).

ments, there is, in fact, positive evidence from Indian literary texts, images on coins and ceramics, wall paintings, and pictorial graffiti. They demonstrate that a variety of different Indian cultures had the capacity to build large and strong vessels, sometimes with two or three masts and square-rigged sails, alongside smaller sewn and log vessels that were capable of crossing the Indian Ocean.[112] This is confirmed by the *Periplus*, which mentions large Indian vessels, such as those from Barygaza, as well as very big dugout canoes from Limyrike (Malabar), and the very large Indian vessels known as *kolandiophonta*, which sailed in the Bay of Bengal.[113] Some texts from the Sangam corpus also speak of impressive Indian ships, like the *Maturaikkanci*, which describes huge ships with posts and sails.[114] Gurukkal downplays the significance of these references by pointing to the poetic nature of the texts, but this need not mean they lack historical validity, especially in light of other available evidence.[115]

In the Hoq Cave on Socotra there are three representations of ships, one of which depicts a ship with two rudders and probably three masts on the front (sharing parallels with images from Ajanta). This was created by an Indian visitor, to judge from the palaeographic context.[116] One Brahmi inscription from this cave, dating between the second to fourth centuries CE, mentions '[t]he captain Visnudhara from Bharukaccha [Barygaza]'. The term *niryāmaka* used in this inscription designates either a captain, a steersman, or a pilot. Another inscription mentions '[t]he son of the captain [*nāvika*] Humiyaka'.[117] Clearly, some Indians operated their own ships and were not passive merchants taking passage on foreign vessels.

Not only did many cultures across the Indian subcontinent possess the shipping technology necessary to proactively engage in Indian Ocean commerce,

112 Cimino (1994): 38–42; Deloche (1996): 201–206; Whittaker (2004): 153; Whitewright (2008): 308–309; H. Ray (2015): 186–187; Tripati (2011): 1076–1077 (large vessels with masts); see a square-rigged sail on a graffito found on an Indian pottery sherd (c. 300 BCE–100 CE) at Alagankulam (Tamil Nadu) and also a Rouletted ware with the image of a couple of masts (first to second century CE)—Whitewright (2008): 147, 149–150, 306–307; Kentley (1996): 247–260 (sewn vessels); Thapar (2002): 236; Cherian et al. (2009): 236–240 (log vessels). See also *Periplus* 32, on ships coming from NW and SW India wintering at Moscha Limen if late in the season.

113 *Periplus* 36, 60.

114 *Maturaikkanci* 135–138.

115 Gurukkal (2016): 86–89.

116 Dridi (2012): 227–228; Strauch et al. (2012): 100–101; Strauch (2012): 364.

117 Trans. from Strauch et al. (2012): 132, 180–181. See Strauch (2012): 346–348 and (2016): 88, on the similar semantic range of *niryāmaka* and *nāvika*.

the evidence suggests they visited Egypt as well as southern Arabia.[118] Foodstuffs associated with Indian culinary habits, most notably rice (as seen from the rice kernels and chaff), but also mung beans (seeds), coconuts (endocarp, exocarp, and mesocarp), and Indian gooseberry have been found at Berenike and Myos Hormos.[119] Of course, it is entirely possible that some of these remains reflect non-Indian consumption. It is worth noting that rice was occasionally used within the Roman world for purposes such as the basis of a medicinal gruel or an ingredient to thicken a sauce.[120] Nevertheless, the possibility of the consumption of rice at the Red Sea ports by Indian merchants should not be ruled out, especially as there is evidence for the de-husking of rice at Myos Hormos (indicative of consumption at this site).[121]

There are many first century CE Indian pottery sherds that have been found at the Red Sea ports. Some of these wares are domestic and probably not reflective of items of trade, but rather are personal items that belonged to Indian merchants.[122] Cooking ware, sharing parallels with that found at Arikamedu, has been recovered from Myos Hormos.[123] At Berenike, six table-ware vessels have been discovered, including three bowls of Arikamedu Fine Ware 1 and another, similar bowl of poorer quality. Berenike also provides examples of cooking ware that cannot be directly equated with material from Arikamedu but would seem to have a South Asian origin. This includes cooking pots with sharply everted rims (Wheeler Type 24), casseroles with out-turned rims (Wheeler Type 25), and flanged casseroles and lids (Wheeler Type 28–29). There seems to be a bias towards pottery originating in eastern India, with much less from the Malabar Coast and few northwest Indian vessels (there is a notable a lack of Red Polished Ware).[124]

A variety of Indian scripts and symbols have been found in the Eastern Desert and at the Red Sea ports. Among the latter are Indian religious symbols

118 Autiero (2015): 115–116, 118.

119 Cappers (2006): 104–105, 109, 156; Van der Veen and Morales (2015): 56. Gooseberry only at Berenike. For a single grain of rice found at Didymoi see Tengberg (2011): 207.

120 Horace *Sat* 2.3.155; Dioscorides *MM* 2.117; Thorley (1969): 222.

121 For the view that this rice was most likely consumed by South Asians at the Red Sea ports see Sidebotham (2011a): 228; Sidebotham (2014): 627; Evers (2016): 164.

122 Sidebotham (1999a): 7. It is also worth noting that, 'to a lesser extent', Indian pottery has also been recorded at Koptos; on the Koptos-Berenike road a single sherd at Vetus Hydreuma has been found, a complete Indian cooking pot at Didymoi, and a possible Indian (Cheran) coin at Dios—Tomber (2017): 541.

123 Whitcomb (1982b): 67.

124 Tomber (2000): 624–630; Tomber (2005): 226; Sidebotham and Zych (2011b): 49–50; Strauch (2012): 371.

found in the hinterland of Myos Hormos, such as *svastikas*, which are important in Buddhism, Hinduism, and Jainism.[125] This type of pictorial graffiti can be difficult to date, but the find of this symbol on fragments of coarse ware at Berenike does suggest this imagery was drawn in the Roman era.[126] In terms of written graffiti, a piece of first to second century CE amphora found at Myos Hormos records the names Kanan and Cātan in the Brahmi script similar to that found at Arikamedu.[127] Intriguingly, the name Kanan also occurs on the rim of a jar at Arikamedu—perhaps simply by coincidence, but Begley suggests it may refer to the same person.[128] Another possible personal name, 'Panai Ori', has been found written twice on opposite sides of the rim of an Indian storage jar.[129] Furthermore, Brahmi script has been found at Berenike on a fragment of Dressel 2–4 amphora, which mentions a 'Korran, the chieftain'.[130] A Prakrit inscription discovered on an ostrakon at Myos Hormos lists goods (oil, meat, wine) belonging to three individuals named Halaka, Vinhudala (likely Visnudatta), and Nakada (possibly Nagadatta). Salomon has determined that the script resembles the Brahmi found at such sites as Nagarjunakanda (southwest India) and Amaravari (central-southern India) around the second to third centuries CE. This suggests a possible origin from the Deccan. With the exception of this inscription, the other Brahmi inscriptions seem to reflect the Tamil language, leading Salomon to argue that South Indians were the main traders from the subcontinent.[131] The dominance of South Indian wares at the Red Sea ports suggests that this is correct to an extent.

Brahmi script was not exclusive to the southern peninsula of India. This can be seen from the Hoq Cave on Socotra where 192 Brahmi epigraphs (and one Kharosthi epigraph) have been found (largely dating between the second to fourth centuries CE). These mostly reflect the Sanskrit language, but 21 are probably Middle Indic.[132] Strauch has argued that the style of the scripts indicates that almost all of the individuals who left these writings were from the Western Gujarati or Western Kshatrapa areas of western and north-western

125 Peacock et al. (2006a): 20.

126 Sidebotham and Zych (2010): 14.

127 Mahadevan (1996a): 291; Whitcomb (1979a): 18; Johnson (1982a): 263–264; Gurukkal (2016): 36.

128 Begley (1996a): 23–24; see also Wheeler, Ghosh, and Deva (1946): 109.

129 Tomber et al. (2011): 8.

130 Mahadevan (1996a): 291; Mahadevan (1996b): 205–208.

131 Salomon (1991): 731–735.

132 Strauch et al. (2012): 30, 205–206; Strauch (2012): 254, 261, 288–289, 309; Strauch (2016): 83–84.

India. Indeed, one of these Brahmi inscriptions records a Samghadasa, son of Jayasena, an inhabitant of Hastakavapra (the Astaka[m]pra of the *Periplus* and Ptolemy's *Geography*). This was a port situated on the western shore of the Gulf of Cambay. A Pri(ya) from Vidisha (in modern Madhya Pradesh) also left a record, as did several other individuals from Bharukaccha, the Barygaza of the *Periplus* (Visnudhara, Suraganja, Siha, Suraganja, and N.N., son of Aruyani). Of even more interest is a bilingual Brahmi and Graeco-Bactrian inscription on a piece of broken stalactite, which mentions the name Humiyaka or (H)umyag. There are also inscriptions alluding to individuals from the Saka (Western Kshatrapas) territory (one, in fact, dated to the Saka year 154, or 232 CE).[133] Did many Indian traders and sailors from western and north-western India primarily go to places like Socotra rather than frequent the Red Sea ports? This is a possibility, but the presence of Gujarati Organic Black Ware at the Red Sea ports may indicate that a few did.[134]

The literary sources also make reference to the presence of Indians in Egypt. Dio Chrysostom claims that Indians, Bactrians, Arabs, and Ethiopians were a frequent sight in Alexandria, and that they were often in the audiences at shows.[135] It is reported in the *Historia Augusta* that Ethiopians, Arabs, Bactrians, and Indians were part of Aurelian's triumphal procession after he defeated Firmus' rebellion in Egypt.[136] It is true that the *Historia Augusta* does not enjoy the highest reputation, and there may be an element of the panegyric (Aurelian subjugating all the peoples of the world). Nevertheless, there is nothing implausible in the idea of small communities of such people living in cosmopolitan Alexandria. Xenophon of Ephesus, in his novel *The Ephesian Tale*, has an Indian chieftain come to Alexandria to sightsee and trade who seemingly possessed a (temporary) home in the city.[137] This novel is, of course, a fictional piece of work. However, believability was an important element in these ancient novels, and they often contained authentic details.[138] These texts, coupled with the evidence examined above, suggest that there is little reason to reject the idea that some Indians or Arabians resided for periods of time in Alexandria. It is true that classical sources were not always specific in their des-

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133 Strauch (2012): 261, 321, 335–336, 344–345; Strauch et al. (2012): 52–53, 96–97, 111, 116–117, 132, 136, 141, 161–162, 173, 202–203, 211, 213–215; Strauch (2016): 91. *Periplus* 41, 43, 49; Ptolemy *Geog*. 7.1.60.

134 Tomber (2008): 48–49, 155–156.

135 Dio Chrysostom *To the Alexandrians* 32.40.

136 SHA *Aurelian* 33.4.

137 Xenophon of Ephesus *Ephesian Tale* 3.11–12.

138 Morgan (1993): 175–229.

ignation of ethnic labels, and often assigned broad characteristics to "similar" groups.[139] However, Dio Chrysostom, Xenophon, and the author of the *Life of Aurelian* (Flavius Vopiscus) are very specific in their designations of different ethnic groups; there does not seem to be any indication of confusion.

Recent DNA studies also confirm that peoples could travel to locations a great distance from their home of origin. For example, skeletal remains (dating between 2500 BCE and CE 500) have been unearthed at two sites in the middle Euphrates valley, of which analysis of the mitochondrial DNA suggests they originated from southern India (most likely from Tamil Nadu).[140] Even more surprisingly, studies of the skeletal morphology of 22 individuals at a second to fourth centuries CE grave site in Lant Street (London) revealed four individuals of likely African ancestry, and two (possibly three) of probable Asian ancestry. So far, the use of such studies to identify individuals with East Asian ancestry in the Roman Empire has not been common—a notable supplementary example being an individual found in an imperial estate at Vagnari (Italy).[141] In the future, such research may provide an invaluable insight into the migration of peoples to distant regions.

Roman Merchants in Indian Ocean Ports

The evidence for the presence of long-term Roman residents in East Africa, southern Arabia, and India is arguably less secure than that examined above. One of the reasons for this is the greater ambiguity in identifying Mediterranean peoples from Indian textual sources. A further reason is contention surrounding the interpretation of some of the archaeological evidence. Turning first to East Africa, there are comparatively few archaeological finds. A few fine wares have been recovered from the East African sites of Heis, Damo, and Ras Hafun. However, as will be discussed below, such fine wares are not necessarily indicative of the presence of a Roman merchant community, nor even of their use by Romans. It has also been suggested that the small quantities only represent a temporary stay during the course of one trading season.[142] The *Periplus* may imply the presence of a Roman community in the territory of the Barbaroi, as the author mentions that Roman money intended for foreign residents could be traded in this territory (olive oil is also mentioned).[143] However,

139 On these comparisons/conflations see Parker (2008): 25–26, 54–55, 93–94, 109, 111; Romm (1992): 82–83; and Schneider (2004): 281–361.

140 Palanichamy et al. (2014): 1–6.

141 Redfern et al. (2016): 11–20.

142 See Kleppe (2007): 92; Horton (1996): 450; Tomber (2008): 99.

143 Seland (2010): 37; *Periplus* 6—… δηνάριον ὀλίγον πρὸς τοὺς ἐπιδημοῦντας.

it can only be inferred, not proven, that the author meant this money was used by Roman merchants (as opposed to other groups).

By comparison, the evidence attesting to the presence of Roman merchant communities in southern Arabia is firmer. Spanish Dressel 7–11 amphorae found at Qana' reveal the consumption of fish products at this site. The idea that these were consumed by Mediterranean peoples, who it is known greatly appreciated these products, is attractive, but the possibility that it was consumed by locals or other foreign residents cannot be ruled out (see below).[144] Though Roman fine wares have been found at Qana', it cannot automatically be assumed that these represent the personal property of long-term Roman residents. Such fine wares were not exclusively possessed by members of the culture that produced them. For example, a Greek graffito appears on a South Arabian vessel at Myos Hormos, while Brahmi script was etched onto a piece of terra sigillata at Arikamedu.[145] With regard to other types of pottery, a word in Palmyrene script, transliterated as *Achaia*, has been found at Qana' on a sherd of what may be a Coan amphora.[146] At what point such writing was etched onto these vessels is unknown.

The presence of Egyptian coarse wares at Qana' can, however, be taken as more tangible evidence for the existence of Roman merchants residing at this port for a period of time. This is because such items would not be seen as prestigious. Moreover, culinary practices (not simply what is eaten, but the methods by which it is cooked or prepared and the utensils employed in doing so) in ancient societies tended to be quite culturally specific. The possibility of Romans residing for a period of time at Khor Rori (Moscha Limen) is also suggested by finds of some Mediterranean coarse wares.[147] The author of the *Periplus* gives the impression that Moscha Limen was not as heavily frequented by Roman merchants as compared to Kane, and it seems the former port was more orientated to trade with the East. But given the bustling cosmopolitan nature of the site, it should not be surprising that there was some contact.[148]

The evidence for Roman merchant diasporas in India is rather contentious. Some of the written evidence opens the possibility that such diasporas existed. For example, the previously discussed census from Arsinoe (72/73 CE) record-

144 Sedov (1996): 24–25. For the popularity of garum in the Roman world see Pliny *NH* 31.43.95.

145 Sedov (1992): 119–120; Sedov (1996): 15 (Roman fine wares at Qana'); Tomber (2004): 357 (vessel at Myos Hormos); Begley (1996a): 23–24 (Arikamedu).

146 Sedov (1992): 119–120; Sedov (1996): 15.

147 Tomber (2008): 104–105.

148 *Periplus* 32; Avanzini (2015): 183, 196, 202–204. For a more sceptical view—Avanzini (2008): 615–618.

ing Gaian's absence in India, as well as his receiving *epikrisis* (exemption from taxes on a person), implies he was away for some time.[149] Admittedly, however, the duration or purpose of his journey is unknown. Casson has also proposed the presence of a resident community of Roman merchants at Muziris on the basis that the author of the *Periplus* reports a demand for 'grain in sufficient amount for those involved with shipping, because the [local] merchants do not use it.'[150] However, following Casson's logic, it would not be possible to exclude north-western Indian, Persian and Arabian merchants who also ate wheat products.[151] References in Tamil literature to Yavana merchant communities in southern India have often been interpreted as indicating Romans, but, as shall be argued below, such an equation is not without its problems.

It would not be surprising if Muziris did have a community of resident Roman merchants, since it was a significant enough port to be mentioned by several authors of the first and second centuries CE. Among these are the author of the *Periplus* (mid-first century), Pliny (early Flavian period), Lucian (mid-second century), and Claudius Ptolemy (mid-second century).[152] The map known as the Peutinger Table shows a *templum Augusti* at Muziris. Rathmann suggests that the surviving version was based on an earlier Late Antique manuscript, which had its final revision around 425 CE but, in origin, may be a map dating back as far as the early Hellenistic period. He plausibly proposes that it was revised piecemeal (not systematically and completely) at various points.[153] Some have doubted that the *templum Augusti* existed and suggest instead that the representation actually alludes to a notable local landmark for navigators, such as the temple of Agastya at Cape Comorin.[154] However, this seems difficult to substantiate when examining the map. For starters, the temple is not located on the southern tip as might be expected with the temple of Agastya. Furthermore, it is not surprising that the temple is represented immediately to the left of Muziris rather than in it, since artistically it would be much

149 *P. Lond* 2.260, 1.42; Raschke (1975): 241; Sidebotham (1986): 92.

150 *Periplus* 56.18.21–22—trans. from Casson (1986): 85, see also 24 and 221. Likewise, Suresh (1992): 4.

151 For later medieval evidence of these groups eating wheat products see Chaudhuri (1985): 23–29.

152 *Periplus* 53–54, 56; Pliny *NH* 6.26.104; Lucian *How to Write History* 31; Ptolemy *Geog.* 7.2. Seland (2007a): 73–74; and Bagrow (1945): 385.

153 *Tabula Peutingeriana* 11.5; Rathmann (2016): 341, 355–361. For a more cautious view see Talbert (2010): 136–142.

154 H. Ray (1988): 314; H. Ray (1994): 66; H. Ray (1995a): 80. Ball (2000): 131 (a local god equated with the cult of Augustus); *contra* Fauconnier (2012): 91.

FIGURE 8 *Image of the* Tabula Peutingeriana*, Section XI. By permission of the Österreichischen Nationalbibliothek, Vienna.*

easier to depict.[155] Alternatively, it has been suggested that the presence of the temple is merely a symbolic projection of Roman notions of their own power, rather than a reflection of reality.[156]

It is certainly true that no evidence for a cult to Augustus has yet been found at Pattanam (most probably ancient Muziris), although religion was often important as a focal point for diaspora communities.[157] There is evidence that the Imperial cult was present in places beyond the frontier, including at Vologesias (in modern Iraq), having been set up by the Palmyrene Soades.[158] This cult would make a good choice as a unifying focus for the diverse cultural groups from the Mediterranean world participating in the Indian Ocean trade. This is especially the case prior to the rise of Christian sects, which could offer a cohesive connection between individuals from potentially different backgrounds.[159]

155 Maps with distortions were accepted in Antiquity in order to represent a desired feature or area—Rathmann (2016): 352.
156 Parker (2008): 246.
157 McLaughlin (2010): 49.
158 *SEG* VII 135; Fauconnier (2012): 92.
159 Seland (2013): 380, 384–388.

In the reign of Constantine, Eusebius claimed that an Indian embassy informed the emperor that their countrymen paid homage to him, including with paintings and statues (implying some kind of cult).[160] Metzler has even suggested that the temple of Augustus on the Peutinger Table could be seen as diplomatic manoeuvre by local chieftains, although there is no proof for this assertion.[161]

Excavations at Pattanam (Muziris) reveal its integration into wider Indian and international trade networks. The presence of early historic jars (Wheeler Type 24) and Rouletted Ware demonstrate the port's connection to Arikamedu and southeast India, while Yemenite, Parthian, and Sasanian ceramics attest to links with western Asia.[162] Pattanam also clearly had connections with the Mediterranean world, as attested by the discovery of thousands of sherds from Roman amphorae. These include Dressel 2–4 amphorae from the Bay of Naples (late first century BCE to first century CE), sherds of oil and garum containers, and terra sigillata sherds. Roman glassware has also been identified.[163] Other attestations of the site's connection with trade can be seen from the structural remains of a wharf, where botanical finds and West Asian ceramics were found preserved underneath a canoe. The botanical remains include pepper, cardamom, frankincense, and grape seeds. The canoe, on the basis of the associated ceramics, was dated between the second century BCE and the second century CE.[164] DNA analysis of 12 bone samples from Pattanam give further indications of international contacts, with three showing origins from southeast Europe or West Asia and one from the Baltic Sea region.[165]

Besides Muziris, others have argued for the existence of a Roman merchant community at Arikamedu (Graeco-Roman Poduke). Roman fine ware is thought to be indicative of this presence. At least 50 sherds of terra sigillata along with four potter's stamps ('U. BEI', 'ITTA', 'CAMVRI', and 'C. VIBI OF') have been identified.[166] However, as has been noted, fine wares were not restricted

160 Euseb. *v.Const.* 4.50; Kolb and Speidel (2015): 130.

161 Metzler (1989): 197–200.

162 Cherian et al. (2009): 237 (indigenous ceramics); Shajan et al. (2004): 312–317 (foreign ceramics); Abraham (2009): 18, 21; Selvakumar, Shajan, Tomber (2009): 35–36. More generally see Cherian (2015).

163 Cherian et al. (2009): 236–237 (Dressel 2–4); Shajan et al. (2004): 313–320 (Roman material in general); Sidebotham (2011a): 191 (number of amphorae sherds). See also Abraham (2009): 18, 20; Selvakumar, Shajan, Tomber (2009): 35; Cherian (2009–2010): 154–155; Seland (2014): 373; Mathew (2015): 17; Tomber (2015): 387–388; Gurukkal (2016): 31.

164 Cherian et al. (2009): 236–239.

165 Selvakumar (2015): 287–288.

166 See Wheeler, Ghosh, and Deva (1946): 39–40; Wheeler (1951); Wheeler (1954): 148–149;

to the communities that produced them, as is apparent at Arikamedu from the presence of a megalithic graffito on a sherd of terra sigillata (c. 30 CE).[167] The fact that terra sigillata wares have also been found at inland sites like Kodumanal and Karur (Tamil Nadu) mitigates the idea that they should necessarily be interpreted as the property of Roman merchants.[168] It is entirely possible that some of these items were prestige objects.[169] Moreover, even if the fine ware at Arikamedu could be attributed to the presence of a Roman merchant community, the dating of the finds suggests that it must have been very brief. Most of the terra sigillata found at Arikamedu was likely produced in the early decades of the first century CE.[170] As Slane argues, they may in fact have come as a single shipment (c. 40–50 CE) given its uniformity.[171]

Other evidence cited as proof of a Roman merchant community at Arikamedu includes a few amphorae that contained foodstuffs generally associated with Western tastes, namely olive oil and fish sauce. Among these finds are nine fragments of early Spanish jars for garum (Dressel 7 and 8, c. late first century BCE to first century CE) and two fragments of Spanish olive oil amphorae (Dressel 20—these fragments are probably early first century CE).[172] Some have claimed that since garum was a Roman delicacy it must have been consumed by Romans present at the port, not by the local population. It has even been suggested that olive oil may have been used for burning in the Yavana lamps mentioned in Sangam literature, a curious but purely speculative idea.[173] Dismissing the possibility that the local population consumed this garum is likely a mistake, for the existence of a trade in refined fish is mentioned in Sangam

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Suresh (1992): 44; Suresh (2004): 113–114; Strauss (2007): 266. Stern (1991) makes a similar argument about Roman glassware. Gurukkal (2016): 189–190, makes similar suggestions about Pattanam. Tomber (2015): 389–391, offers the more qualified view that these items could be appreciated both by foreigners and local elites.

167 Begley (1993): 99; Begley (1996a): 18.

168 On these finds see Suresh (1992): 44–45. At least 11 sites in India have revealed terra sigillata—Krishnan and Balvally (2015): 234–235.

169 H. Ray (1994): 51.

170 Comfort (1991): 134–149; See also Begley (1996a): 22; Slane (1996): 366.

171 Begley (1996b): 132–133; Slane (1996): 366–368.

172 Sidebotham (1996d): 70, 112; Begley (1993): 102; Suresh (2004): 105; Will (1991): 153–154; Tchernia (2016): 220. For a review of amphorae dates see Peňa (2007): 353–358.

173 Suresh (1992): 47; Suresh (2004): 105 (garum consumed by Romans); McLaughlin (2010): 56—*Perungadai* 1.17.15. Cimino (1994): 164. A Yavana lamp whose wick gives out a steady flame without a flicker—*Perumbanatruppadai* 316–318; statues like women—*Nedunal* 101–103—Suresh (1992): 2. See also Broekaert (2017): 13–14.

literature and there is no inherent reason why garum would be disliked. The possession of such a novelty may also have been desired as much for prestige value as for enjoyment.[174]

Wheeler proposed that Roman craftsmen were resident at Arikamedu, on the basis of two gems with carvings on them. One of these gems is a surface find (carnelian) that portrays the head of Augustus in the intaglio, the other (quartz) a depiction of Cupid with a bird. Because the intaglio is untrimmed, he presumed it was an unfinished local product, made by a Mediterranean craftsman at Arikamedu.[175] However, there is plenty of evidence for Indians replicating items imported from the Mediterranean, including imitation Roman coins (both metal and clay), which were sometimes pierced for jewellery.[176] It is also possible that these gemstones were imported semi-worked, to be finished off by Indian craftsmen. The reverse of this practice is indicated by cameo blanks found at Berenike that were imported from Arikamedu, roughed out and needing to be finished.[177]

Earlier excavators at Arikamedu originally interpreted Rouletted Ware as a Mediterranean import, but, as noted in Chapter 2, it has now clearly been shown to be indigenous to India.[178] Nevertheless, some have suggested that, despite it being indigenous, this Indian fine ware shows Mediterranean influences.[179] Suresh broadly distinguishes two types of Rouletted Ware in India: a finer variety, which, he argues, is very similar to what he terms 'Mediterranean Rouletted Ware' (that is, Arrentine ware), and a cruder variety. He notes that the finer variety is concentrated in coastal areas, particularly port sites, leading him to argue that this reflected the presence of Mediterranean residents in India whose techniques were copied.[180] This theory, however, is problematic, since Rouletted Ware was already in use prior to the Roman era of Mediterranean involvement in the Indian Ocean trade.[181] It has been argued in Chapter 2 that Coan wine was being brought to Arikamedu in the Ptolemaic period. However,

174 Seland (2007a): 70; *Puranannuru* 374; *Porunarattrupadai* 250–260; see also Tomber (2009): 47–48; Tomber (2015): 388–389.

175 Wheeler, Ghosh, and Deva (1946): 101; Suresh (2004): 141–142; see also Sidebotham (1996e): 389, on a chariot seal impression which may show Mediterranean influences.

176 Suresh (2004): 58–66, 77–81.

177 Sidebotham (2011a): 238.

178 See Begley (1988); also Suresh (2004); Ford et al. (2005); Magee (2010).

179 Magee (2010): 1044–1046, 1051–1053; Suresh (2004): 94; Seland (2014): 371; *contra* Ford et al. (2005): 909–912.

180 Suresh (2004): 94; see also Cimino (1994): 152.

181 Begley (2004a): 2–3 (mid-late second century BCE); Salles (1996b): 262; Magee (2010): 1044.

this is very far from suggesting the presence of Mediterranean merchants at the site at this time. If some of the finer pieces of Rouletted Ware do suggest a similarity to Mediterranean pottery, this is far more likely to be the result of indigenous imitation rather than the direct input of resident Mediterranean craftsmen.

In fact, most Roman merchants are unlikely to have regularly sailed to the east coast of India, since this carried a greater risk of missing the window (December to early January) for a safe return voyage within the year's trading season. The shallow channels between the southern tip of India and Sri Lanka made it difficult for deep-hulled vessels to traverse, while the difficult weather conditions made it problematic to sail round the southern tip of India until January—the period in which, according to Pliny, most merchants would have already set off for Egypt.[182] It was possible to travel overland via the Palghat Gap (a mountain pass), although how many Roman merchants would have undertaken such a journey is difficult to know.[183]

Without frequent Roman traffic, there may have been less of an imperative for Roman merchants to reside on the eastern coast of India. The archaeological evidence shows that ports on the south-western coast had trade links with Sri Lanka, as well as eastern and northeast India (as evidenced by finds of Northern Black Polished Ware, dated to 700–100 BCE).[184] Therefore, in most cases, it would have been easier to simply acquire goods from these regions at places like Muziris. Indeed, the author of the *Periplus* makes it clear that products from the interior of India, the Ganges region, and Chryse (Southeast Asia) were available at Muziris and Bakare.[185] In addition, the fact that the author alludes to the kingdoms of the Chera (Keprobōton) and Pandya (Pandion) but says nothing directly about the Chola probably reflects limited travel beyond Cape Comorin in this period (mid-first century CE).[186] This notion is further supported by the

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182 Pliny *NH* 6.26.99–105; Casson (1989): 10, 24–25; Kearney (2004): 11; McGrail (2004): 250; Tripati (2011): 1078–1080; Fauconnier (2012): 89–90. If the Romans did circumnavigate Sri Lanka it was probably not until the second or third century CE—de Saxcé (2015b): 63; Schenk and Weisshaar (2016): 464–465.

183 On the possible use of the Palghat Gap see Suresh (2004): 30–31, 153–154; Selvakumar (2015): 275.

184 Tripati (2011): 1081–1082; de Saxcé (2015b): 54–68. It is also thought that the shipwreck from Godavaya, Sri Lanka (dating from radiocarbon analysis from the second century BCE to the first century CE) came from Southern India and attests to early commercial contact—Carlson and Trethewey (2013): 9; Muthucumarana et al. (2014).

185 *Periplus* 56. For a review of the various inland and seaborne trade links connecting Muziris to other regions of India see Chakravarti (2015): 323–332.

186 Seland (2010): 59.

author's reference to transport along the east coast of India being conducted by vessels from Limyrike (the Malabar Coast) and the north (the Ganges Delta, perhaps even Burma).[187]

In overview, the archaeological, textual, and cartographic evidence considered so far does not place the existence of Roman diasporas in India beyond doubt, but nor should the caveats discussed above rule it out. Indeed, the western coast of India would have boasted a number of advantages that such diasporas could provide to those engaged in the trade. In the case of the eastern Indian coast, there may be greater cause for doubt due to the aforementioned practicalities. That said, the presence of eastern Indian cooking ware at Berenike and the reference to Kanan in Brahmi script at Myos Hormos and Arikamedu suggest that merchants from the region were visiting the Red Sea ports. Given the existence of such connections, the reverse situation of Romans visiting and even being resident at East Indian ports is not beyond the realms of possibility.

The Yavanas

The existence of Roman merchant diasporas in western, south-western and south-eastern India has often been suggested on the basis of references to Yavanas in Indian literature and inscriptions. The term Yavana is generally regarded as deriving from the Persian term for Ionians, Yauna, which was then transmuted into the Prakrit Yona, and Sanskrit Yavana. By the first half of the first millennium CE, however, the term Yavana gradually developed a broader meaning, essentially designating a foreigner from the west—that is to say, not just people from the Mediterranean world, but potentially Arabs, Persians, or others.[188] The term was not necessarily employed in a derogatory way, unlike words such as *mleccha* (a barbarian outsider, unsubscribed to the norms of Indian society).[189]

187 *Periplus* 59–63.

188 Balasubramanian (1980): 14; H. Ray (1988): 312; H. Ray (1994): 83–84; Ball (2000): 126, 131; Parker (2008): 173; Fauconnier (2012): 95. See *Mahabharata* 6.9 (c. 400 BCE–400 CE)—where the Yavanas are regarded as among the tribes of the north. Thapar (1978): 147–148, notes that a later tradition developed the myth of the Yavanas originated from Turvasu son of Yayâti (a Puranic king). Mair (2014): 128 n. 110, notes that even as late as the nineteenth century the term was sometimes used of the British. Also for doubts about whether the Yavanas necessarily equate to Romans in this period see Parker (2002): 63–64.

189 Mair (2014): 129; see the *Malaippattu* where Yavanas and dumb *mlecchas* are referred to in the same passage as body-guards at the royal camp—Zvelebil (1956): 404.

Several references to Yavanas appear in Tamil epic poems and a corpus of poetry known as Sangam (or Cankam) literature. These deal with topics such as love, war, politics, and loss. These references are usually brief and incidental. Certainly, none of these poems are primarily concerned with Yavanas. This is a notable contrast to Graeco-Roman literature, where a number of works discuss the geography, botany, zoology, ethnography, and paradoxography associated with India. Unfortunately, the Sangam poems cannot be precisely dated, and the whole corpus has been placed in a chronological range spanning 300 BCE to 600 CE.[190] Works within this corpus are often broadly dated within a century or two.[191] This broadness in dating is problematic, making it unclear how long a process it was for the term Yavana to evolve from a specific designation of a Greek speaker, or someone who adopted aspects of Hellenic culture, to a broader term which denoted a Western foreigner. The problem can be seen with the *Mahavamsa* (fifth century CE), a Sri Lankan Pali text outside the Sangam corpus. In this text, there is a reference to a Yavana quarter in Pandukubhaya (Sri Lanka) in the early fourth century BCE, something which clearly cannot reflect the presence of Mediterranean merchants.[192]

Since the texts that form part of the Sangam corpus obviously reflect the poetic and creative talents of their authors, some have raised questions about their historical veracity.[193] Gurukkal is sceptical as to whether meaningful historical information can be obtained from these texts, due to their poetic nature and use of stock phrases and colourful descriptions.[194] However, this does not seem to be an adequate reason for dismissing the value of references to Yavanas in these texts. Even if these poems are not alluding to actual events, they nevertheless reflect the world in which they were created. There would be little point in making allusions to groups like the Yavanas if it did not mean something to the audience of these poems. Consequently, there is some value in considering what these texts have to say, but they need to be treated with due caution.

References to Yavanas in the Sangam literature show them in a variety of roles. One poem describes the Yavanas coming to exchange gold for pepper.[195]

190 H. Ray (1988): 313; Suresh (1992): 2; Cutler (2003): 146; Abraham (2003): 211; Tomber (2008): 26.

191 For the Sangam texts mentioning Yavanas see Meile (1940–1941); Zvelebil (1956); Gurukkal (2016): 82–90.

192 *Mahavamsa* 10.90.

193 Darley (2015): 66–67 n. 23.

194 Gurukkal (2016): 82–90.

195 *Akananuru* 149.9 (gold for pepper)—see also *Purananuru* 343.1–10 (dates c. 200 BCE–100 CE). Ancient Nelkynda may equate to modern Nakkida, while Bakare may be modern

Identifying these Yavanas with Roman merchants appears reasonable, given the numerous finds of *aurei* in southern India and the reference in the *Periplus* to money being exchanged for pepper at the ports of Muziris and Bakare.[196] However, it should be noted that the Romans were not the only ones bringing in gold, as another reference in the *Purananuru* refers to Indian vessels, outside the Cheran kingdom, conveying shipments of this precious metal.[197] A further reference in the *Purananuru* refers to the sweet cool wines brought by Yavana ships.[198] Again, identifying these Yavanas with Roman merchants does not seem too controversial, given the abundant evidence for the export of Mediterranean wine to India.[199]

However, Yavanas appear in a number of other roles besides that of a merchant. One example is the role of craftsman or builder.[200] The discussion of ship construction in Chapter 3 demonstrated that skilled craftsmen would have been needed on the Roman vessels sailing to India in order to repair equipment and keep the ship seaworthy. Hence, it is not beyond the realms of possibility that some of these individuals sought employment in India. In this vein, it is interesting to note *The Acts of Thomas*, where the apostle is brought to India as a slave carpenter and proceeds to engage in a series of Christian conversions.[201] Another role was that of mercenary soldier. In one epic, the *Silappatikaram*, reference is made to a Yavana guarding the palace in the capital Madura in the Pandyan kingdom (in Tamil Nadu). There is also a reference in the *Mullaippattu* to Yavanas guarding the royal tent of the Pandyan prince, wearing their peculiar clothing and stern looks.[202] De Romanis has advocated the idea, followed by McLaughlin, that some of the guards accompanying Roman merchants on their ships became employed as mercenaries in some of the southern Indian kingdoms. In support of this, he points to Pliny's reference to archers being employed on ships sailing to India to protect them from prolific piracy.[203]

While De Romanis' idea is interesting, and certainly not impossible, there are reasons to be a little more circumspect in identifying these Yavanas with

Purakkad—Malekandathil (2015): 342; Selvakumar (2015): 289–290; Gurukkal (2016): 160–161, 168–169.

196 *Periplus* 56–57.

197 *Purananuru* 126.14–17—see Whitewright (2008): 60.

198 *Purananuru* 56.18–21.

199 See Chapter 7.

200 *Manimekalai* 19.5.108 (c. 600 CE—a pavilion built by Yavanas).

201 *The Acts of Thomas* Second Act 17.

202 *Silappatikaram* 14.66–67 (c. 200–600 CE); *Mullaippattu* 2.59–62.

203 De Romanis (1997a): 102–105; McLaughlin (2010): 55.

peoples from the Roman world. The potential for misidentification has been noted by Tieken, who argues that the Yavana mercenary mentioned in the *Malaippattu* had wrongly been assumed by Meile to be Greek. Meile had believed the Tamil *mattikai* was based on the Greek μάστιξ (*mastix*), the term for a whip.[204] Tieken, drawing upon other Tamil literature, argues that *mattikai* was more likely to refer to a bridle or a band put around the head (an Arab *kuffiya*), while the reference to *meyppai* referred to a bag-like cloth covering the whole body (more akin to Arabic clothing). It is also suggested that this use of the term Yavana was not intended as a designation of a specific ethnic group, but in this context simply denotes a mercenary soldier.[205]

Another example of this complication can be found among the Brahmi inscriptions at the Hoq Cave on Socotra, one of which records an individual called Candrabhūtimukha, who describes himself as a Yavana.[206] It is not impossible that he was someone of Greek or Greek-speaking origin who had integrated himself into western Indian society and continued his career as a merchant, subsequently visiting Socotra and leaving a Sanskrit language inscription written in Brahmi script. However, it is more likely that the label Yavana should be understood in a different sense in this context, which, by implication, means caution is warranted when the term appears elsewhere.

It is important to recognise, then, that not all references to Yavanas can be assumed to represent Romans. Given the corroborating evidence for the trade in Mediterranean wine and black pepper, a degree of confidence may be felt in associating the Yavanas mentioned in the *Purananuru* with people from the Roman Empire. However, is the same confidence warranted in references to Yavana artisans and mercenaries? In this respect, it should be noted that references to Yavanas in the role of merchants appear in a text which dates to an earlier period in the Sangam corpus (perhaps first century CE), whereas the texts mentioning Yavanas in the role of artisans or mercenaries are thought to date broadly to the second century CE or later.[207] The *Manimekalai* may, in fact, date to the mid-first millennium CE.[208] Given that the term Yavana expanded in meaning over time, these later texts need to be treated with more caution.

204 Meile (1940–1941): 85–123.
205 Tieken (2003): 261–271.
206 Strauch (2012): 348; H. Ray (2015): 141.
207 H. Ray (1995a): 78–79; see also Zvelebil (1956). H. Ray (1994): 51, who notes the problem with indiscriminately associating the Yavanas with Romans.
208 Zvelebil (1956): 405–406.

In fact, in a number of instances, a Roman designation for the term Yavana is clearly inappropriate. This can be seen from an inscription (dating to the latter first or second century CE) set up by order of the Satavahana queen Bālasrī, eulogising her son, Gautamiputra Satakarni. He is recorded as routing the Sakas, Yavanas, and Pahlans from the Deccan forever.[209] The first thing to note is that the Yavanas mentioned here are associated with peoples from the north, such as the Sakas, conforming to the description of their origin in the *Mahabharata*.[210] Also, the inscription implies these were invading groups to be driven out. In this context, it is far more plausible to believe that the Yavanas referred to here were in some manner associated with areas once occupied by the earlier Indo-Greeks, or in some way considered connected to these former groups. It may also be the case that another group had been given this label.

Clearly, not every reference to Yavanas in the first half of the first millennium CE should be taken to represent Romans, and in many cases it would be inappropriate to do so. Nevertheless, some scholars have sought to link a collection of inscriptions in western India that record religious donations made by Yavanas to the presence of "Roman" merchants in India. Six were found in Karle (Maharashtra, c. 50 to 60 kilometres from the west coast of India) and possibly date from the second century BCE to the second century CE—five of the dedicators claim an origin from Dhenukātata. Three inscriptions were discovered at Junnar (Maharashtra, c. 100 to 110 kilometres east of Mumbai), but these dedicators did not give their origin.[211] Dhavalikar argues that these places had sizeable Yavana populations who were engaged in commerce. He cites the presence at Junnar of a finely carved classical figure of a baby Eros, lying in half of an egg, as additional confirmation.[212] It has also been suggested that the Yavanas did not need to mention their profession, as they were exclusively traders, and that the gifts they donated represented attempts to participate in Buddhist trading networks.[213] Indeed, it has been argued that community

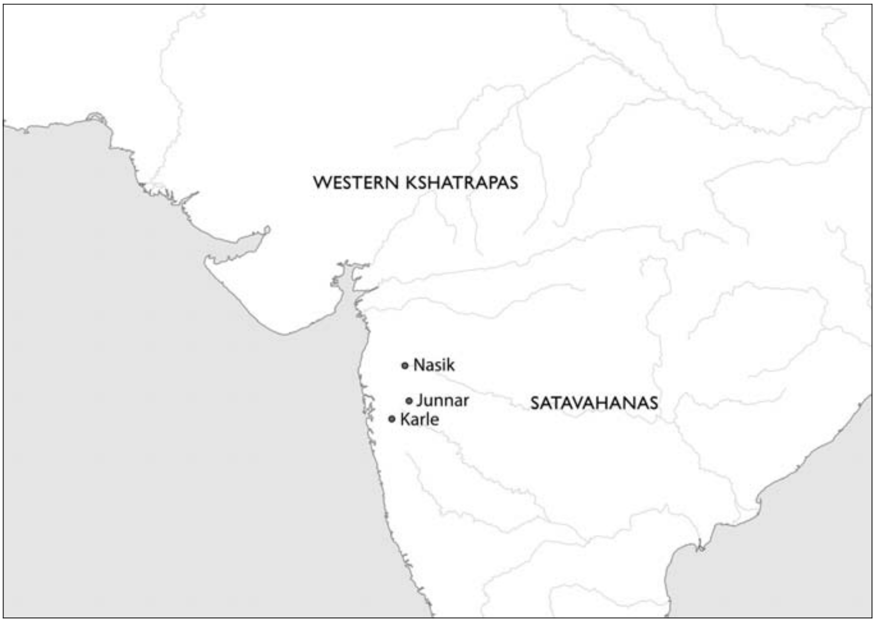
209 Kârla Inser no. 17; Rawlinson (1926): 85; Shastri (1993): 64. See also the *Cilappadigaram*, 29 *ucalvari*, 11–12, for a poetic allusion to controlling a great swath of territory, including that of the rich countries of the Yavanas.

210 *Mahabharata* 6.9.

211 Margabandhu (1965): 322; Dhavalikar (1992): 326–327; Ray (1988): 314–315; Shastri (1993): 59–62; McLaughlin (2010): 47; McLaughlin (2014): 170; Fauconnier (2012): 99.

212 Dhavalikar (1992): 326–327. See also Shastri (1993): 63. On the significance of eggs in Graeco-Egyptian religious conceptions and practices, and the ritual use of ostrich eggs in Late Roman Berenike, see Wilburn (2015): 263–281.

213 H. Ray (1988): 315–317; H. Ray (1994): 84; H. Ray (1995a): 84; for an overview see H. Ray (1987): 99–102.



MAP 4 *Location of Yavana inscriptions in the Deccan*

of Dhenukātata can be identified with the Dounga of Ptolemy's *Geography*—possibly equating to the modern Junnar.[214]

In addition to this, in a Buddhist cave near Nasik (Maharashtra, c. 120 kilometres east of the coast) there are some Prakrit dedicatory inscriptions by Yavanas, of which it has even been speculated that the image of an owl, appearing in cave 24, might represent a Western iconographic element. Another inscription refers to Raumakas, which some suggest could be associated with Romans.[215] However, since there is insufficient clarity for the terms Yavana and Raumaka, it is difficult to be certain whether either term could refer to Roman merchants or be used interchangeably.

It is of interest to note, when comparing the Sangam literature of southern India, that there are very few epigraphic indications of the presence of Yavanas, whereas the aforementioned inscriptions are very much concentrated in the western Deccan. H. Ray has attempted to explain this by suggesting that in the south the Roman merchants were able to directly participate in commercial

214 Johnston (1941): 208–213; Fauconnier (2012): 100–101.

215 *Epigraphica India* vol. 8; Cimino (1994): 71; Deo (1991): 43; Ball (2000): 126–127; McLaughlin (2010): 47; McLaughlin (2014): 165–166, 169–170.

transactions, whereas in Deccan (central-western India) they were dependent on local merchants.[216] It is entirely possible that many indigenous traders in the Deccan region had some connection with Buddhism, and it is certainly not inconceivable that donations to a Buddhist *sangha* were used to facilitate commercial relations. What is less certain is the need for Mediterranean merchants to become devotees, or for them to reside at sites significantly far inland. That said, it is not impossible that some Mediterranean merchants embraced Buddhism, even if it might be questioned whether this is represented by the aforementioned Deccan inscriptions.

Indeed, it is unlikely that these inscriptions represent dedications by Roman merchants, since there is little reason to think they travelled far beyond the coastal ports. Dio Chrysostom states that merchants who went to India for trade would meet mostly with the coastal population.[217] Given the tight sailing schedules in which many Roman merchants operated, it would make little economic sense for them to travel far inland, and the movement of goods between the coast and the interior was almost certainly undertaken by local merchants. Even for those merchants or agents who were resident in India for longer periods, it is not clear what economic benefit would have been derived (although adventure and curiosity may have been motivating factors). The Graeco-Roman literary sources give the impression that Roman merchants were familiar with the port areas where goods could be purchased, but more ignorant of areas of production and cultivation.[218] For example, Pliny mistakenly asserts that costus came from Patala, on the Indus; in fact, it derived from the highlands of Kashmir.[219] This identification no doubt indicates a hazier knowledge about the interior of India.

References to Yavanas are often the main basis for arguing that Roman merchants travelled inland and integrated into indigenous societies. However, as has been shown, this is questionable. It is not the intention here to go as far as Raschke and claim that Roman trade had little or no impact on Indian Ocean societies; indeed, the existence of Roman merchant diasporas at some of the ports on the Indian coast does seem supportable, though the evidence is not

216 H. Ray (1995a): 79–80. On the use of shared religious practices in helping to facilitate cross-cultural interaction between merchants of different origins see, Broekaert (2017): 11–13, 14–15.

217 Dio Chrysostom *Discourses* 35.22.

218 Keay (2005): 10; Seland (2007b): 217. On the networks connecting sites like Muziris to the interior see Malekandathil (2015): 348–351.

219 Pliny *NH* 12.25.12, 12.29.13; Dalby (2000a): 85, 104.

concrete.[220] What remains doubtful is the idea that many individuals from the Roman Empire travelled far inland and became closely integrated into Indian societies. When Yavanas and other foreign groups are mentioned in Sangam literature it is as residents of port towns, and it is made clear that they lived in separate districts. Their distinctive behaviour is also commented upon. For example, in the *Silappatikaram*, the Yavanas live in lavish houses, along with the other foreigners in the harbour at Puhar (Pomphuar, Tamil Nadu, on the south-eastern coast).[221] The distinctive behaviour of these Yavanas is commented upon, including their peculiar self-adornment, drinking, and habit of walking along the streets at night.[222] If these Yavanas can be identified with Roman merchants it would seem to further support the idea of coastal diasporas, but it is not suggestive of integration within Indian society.

Romans in the Far East

A sophisticated system of trade networks connecting the Red Sea ports of Roman Egypt with East Africa, the southern Arabian Peninsula, and the western coast of the Indian subcontinent were well established by the late Ptolemaic and early Roman periods. Knowledge of the routes and the right times for setting sail had been developed, as had complex organisational structures, including the use of agents by some of the more wealthy and powerful financiers and merchants. Roman merchants operating in the western Indian Ocean (the Arabian Sea, Gulf of Aden, and Red Sea) had to adhere to strict schedules to ensure that they could successfully complete a trading circuit from Alexandria within a year. For some, it is quite likely that this was aided by the existence of diasporas at a number of ports, allowing for advanced negotiations and the acquisition of desired goods prior to arrival. In addition, Roman merchants were certainly not the only ones operating in the Indian Ocean. Complex interregional and international trade links meant that goods from various places, including from further east, could be found at ports on the western Indian coast.

With the availability of such goods and the need to adhere to strict trading schedules, there seems to have been little incentive for Roman merchants

220 Raschke (1978): 679. *Contra* Seland (2010); and Tchernia (1995a): 152–154.

221 *Silappatikaram* 5.9–12 (c. 200–600 CE). See also Ptolemy *Geog.* 7.1.13, where Puhar is called an emporium.

222 *Nelunalvatai* 31–35 (c. 100 BCE–100 CE); *Pattinappalai* 214–217 (c. 100 BCE–100 CE).

to sail very far into the Bay of Bengal beyond perhaps the south-eastern coast. Nevertheless, some scholars have claimed that Roman merchants travelled progressively further east in the course of the first and second centuries CE. This is often supported on the basis of the increasing level of detail appearing in the Graeco-Roman literary sources, with Claudius Ptolemy's *Geography* represented as the apogee.[223] This is notably argued by Weerakkody, who compares the 20 Indian trade centres mentioned in the *Periplus* (mid-first century CE) with the 60 listed by Ptolemy (mid-second century CE). He further argues that a greater level of contact with Sri Lanka is apparent from the fact that Claudius Ptolemy describes some of the goods available from that island.[224] The distribution of Roman coins has also been cited as evidence for increasingly direct contact with the East. Early Republican coins have been found mostly in western areas, such as the Laccadive Islands, Kerala, and areas near the Palghat Gap, whereas many second century CE coins appear in eastern India.[225] Furthermore, Marcotte argues that increasing levels of geographic knowledge about the East can be explained as a result of mercantile exploration. He suggests this is observable in the shifting attitudes from Strabo's time, who deplores the untrustworthiness of merchants, to Pliny's discussion of the trade routes from Alexandria and the island of Taprobane (Sri Lanka), where he makes a distinction between ancient accounts and the more accurate knowledge available in his day, up to the time of Marinus and Claudius Ptolemy, when the accounts of merchants were used to help construct maps of the inhabited world.[226]

It might be questioned whether a comparison between the number of sites mentioned by the author of the *Periplus* and Claudius Ptolemy is necessarily as informative as Weerakkody suggests. The intention of the author of the *Periplus* seems to have been to provide details on the major ports in different regions of the Indian Ocean and the types of goods that could be traded. By contrast, Claudius Ptolemy's aim was to allow his readers to construct a map of the world based on the coordinates given in the text. Given the latter's intention, it should not be surprising that as many coordinates as possible were given for different locations. It is also worth stressing that knowledge of an area does not necessarily equate to direct contact. A case in point is the island of Taprobane

223 Wheatley (1961): 123–137; Suresh (1992): 6; H. Ray (1996a): 3; H. Ray (1996b): 356; McLaughlin (2010): 14, 55, 58 n. 193; McLaughlin (2014): 199.

224 Weerakkody (1996): 54, 89.

225 Singh (1988): 101; Keay (2000): 121–123; Suresh (2004): 153–154. A geographic shift which Suresh ((1992): 58) suggests can be paralleled in the Sangam references to Yavanas at Muziris (*Ahunanuru* and *Purananuru*) and the Coromandel ports (*Pattinappalai*).

226 Marcotte (2016): 174–175.

(Sri Lanka): at the beginning of the Hellenistic period, Onesicritus knew of the island, but there is little evidence of direct Western contact prior to the reign of Claudius. Moreover, only limited Roman material appears in Sri Lanka until the late Roman period.[227] The limited quantity of early Roman finds in Sri Lanka may relate to a lack of direct contact with Roman merchants, whereas by Cosmas' time such links seem to be more frequent.[228]

Concerning the distribution of Roman coins in India, it should be noted that most finds were discovered inland, and the site of their burial is more likely to be due to events within these regions.[229] Thus, the presence of second century Roman coins in eastern India need not entirely reflect the arrival of Roman merchants on the eastern coast so much as the workings of internal trade networks within eastern India. The literary and archaeological evidence is also at variance. Roman knowledge of the East may well have reached its zenith with Claudius Ptolemy, but the archaeological evidence suggests that Roman exports to India, southern Arabia, and East Africa peaked during the first century CE and began to decline during the second century.[230]

It should be stressed that the criticisms expressed above are not intended to suggest that no Roman merchant ever sailed to Sri Lanka or the eastern coast of India in the early Roman period. There is no need to go so far as to suggest that the political authorities in southern India tried to prevent Roman merchants travelling further east in order to maintain a monopoly.[231] Indeed, it is not entirely clear whether the southern Indian kingdoms had the capacity or desire to enforce such a practice. Furthermore, if the Yavanas referred to in the *Silappatikaram* can be equated with "Romans", then some were resident at south-eastern coastal ports like Puhar—although, as mentioned, such an equation cannot be taken for granted. In all likelihood, some Roman merchants did sail to the south-eastern coast, but, as has been mentioned, the majority probably avoided the risk of missing the safe window (December to early January) for a return voyage within the year's trading season.

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227 Strabo 15.1.15 and Pliny *NH* 6.24.81 (Onesicritus); Strabo 2.1.14 (goods brought from Sri Lanka to India); Pliny *NH* 6.24.86 (Sri Lankan embassy to Claudius). Weerakkody (1996): 49; see also Bopearachchi (1996) and (1998). *Contra* Gurukkal (2016): 173–174.

228 Bopearachchi (1996): 68–69; Weerakkody (1996): 10; Cosmas *Christian Topography* 11.336–338. However, on the early nodal role played by Sri Lanka see Seland (2014): 373.

229 See Chapter 7.

230 See Chapter 9.

231 *Periplus* 60; Seland (2007a): 75–77; similarly Walburg (1991): 164–167; McLaughlin (2010): 54.

A few of the more adventurous merchants and ship captains may have strayed even further into the Bay of Bengal by sailing north to the Ganges region or heading in an eastward direction to reach Southeast Asia.[232] Strabo comments that a small number of merchants had reached the Ganges, though he dismisses their significance, while Pliny remarks that the distance from Sri Lanka to the Ganges was equivalent to seven days' sailing by Roman ships, compared to a journey of 20 days made by local reed boats.[233] It has also been noted that Claudius Ptolemy refers to a few local articles of trade that could be acquired beyond the Ganges, a probable reflection of the mercantile nature of some of his source material.[234]

While a few literary sources of the first and second centuries CE do imply some Roman voyages to the Ganges region, they do not offer a sense of their frequency. It might be inferred that such voyages were quite limited. By comparison to peninsular India, little Roman material culture has been unearthed in the Ganges region or the area of Odisha.[235] This absence may be due to a lack of demand for Roman goods rather than lack of availability, since the Ganges region had commercial contacts with western India and Sri Lanka.[236] It may be that future archaeological work changes this picture, but as it currently stands, the evidence is hardly indicative of substantive Roman contact with this region.

A number of Chinese court histories record the arrival of people from Da Qin—Great China—to parts of Southeast Asia and China during the early centuries of the first millennium CE.[237] Da Qin, a term that appears to be entirely Chinese in origin, is often thought to designate the Roman Empire, or at least part of it (suggestions include Egypt and Syria).[238] As noted in Chapter 4, a few of the court histories refer to Gan Ying's unsuccessful attempt to reach Da Qin in 97 CE, but the first successful embassy was purportedly sent to China by

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232 Coming from the other direction a written history of the Han—*Qian Hanshu*—mentions a mission sent by the Emperor Wudi (140–87 BCE) to Huangzhi (probably India)—H. Ray (2015): 89.

233 Strabo 15.1.4; Pliny *NH* 6.24.82.

234 Berggren and Jones (2000): 25–27; Ptolemy *Geog.* 7.2–4.

235 Suresh (2004): 27, 100. See Sengupta (1996): 121, for reference to a few possible terracottas at Nedinipur. See also Tripati, Patnaik and Pradhan (2015): 219–224, for a finds of Roman clay bullae, amphorae and (imitation) coins at Manikapatna, Radhanagar, and Sisupalgarh.

236 Mukherjee (1991): 46.

237 For a list see Hoppál (2011).

238 For this debate see Leslie and Gardiner (1996); Hoppál (2011); Kolb and Speidel (2015); Liu (2017): 2–3.

the King Andun (perhaps Marcus Aurelius) in 'the ninth *yanxi* year during the reign of Emperor Huan' (166 CE). They had arrived via Rinan (a commandery on the central Vietnamese coast) and offered elephant tusks, rhinoceros horn, and turtleshell as gifts.[239] As also noted in Chapter 4, it has often been assumed that these were merchants mistaken for ambassadors. Whatever the case, their appearance was unusual enough in the mid to late second century CE to be commented upon in Chinese court histories.

What is more surprising is the claim made in the *Liangshu* that 'merchants of this country [i.e. Da Qin] frequently visit Funan [in the Mekong Delta], Rinan [Vietnam] and Jiaozhi [Red River Delta, near modern Hanoi]; but few of the inhabitants of these southern frontier states have come to [*sic*—read 'gone to'] Da Qin.' This comment is made in the context of the arrival of Qin Lun, a merchant from Da Qin, at the court of Emperor Sun Quan in the fifth year of the Huangwu period (226 CE).[240] Taken at face value and assuming that the merchants from Da Qin were in fact Roman, the implication is that by the beginning of the third century CE a significant number of Roman merchants were reaching Southeast Asia. However, this is seemingly at odds with the archaeological and numismatic evidence, which suggests a decline in Roman participation during the second and early third centuries CE (though not a complete cessation of trade).[241]

The claims made in the *Liangshu* should not be dismissed out of hand, but there are grounds for scepticism. This text was composed by Yao Silian in the seventh century CE, a number of centuries after the aforementioned arrival of Qin Lun. Thus, it is possible that some of the detail may be anachronistic. Furthermore, by the time the *Liangshu* was written—indeed, even by the time of the *Weilüe* (third century CE) and the *Hou Hanshu* (early fifth century CE)—Da Qin had developed into a place almost mythical in its location and utopian in its society.[242] The authors of these texts were compilers who worked for the imperial bureaucracy and were not relying on first-hand experience. Fantastical claims are made about these people, including the assertion that they were like the Chinese but taller, since 'they say they originally came from China, but

239 *Hou Hanshu* 88.10, 12.—Trans. from Hill (2015).

240 *Liangshu* 6–10—Trans. from Hill (2015). Another reference to people from Da Qin arriving in China is dated to the year 284/285 CE—see Hoppál (2011): 264; Kolb and Speidel (2015): 133.

241 See chapters 3 and 9.

242 Kolb and Speidel (2015): 133 n. 72, suggest that the name "Da Qin" or Great China, which is not a transcribed foreign word, denotes a place connected with the utopia of the Far West.

left it'.[243] Their kingdom was located somewhat to the east of Baiyu Shan or the White Jade Mountains, where Xi Wangmu (Queen-Mother of the West) resided. The king of the people of Da Qin was also said to be a virtuous man, who did not hesitate to abdicate should natural portents require it (in other words, if they were to lose the Mandate of Heaven).[244] Various attempts have been made to connect some of the bizarre features mentioned in these accounts with actual topographical, social, and political features of Roman society, often in a rather convoluted way.[245] It has even been suggested that the "ambassadors" that came to the Han court in 166 CE imparted information that was then recorded in Chinese state records.[246] But it is clear that many of these features have more to do with Chinese conceptions of the world than with the transfer of accurate knowledge resulting from prolonged and extensive contact.

A comparable situation is reflected in the Graeco-Roman sources, where ideas about the people of the extreme East are just as fantastical. The Seres, or Silk-People, are often portrayed as living at the eastern edges of the *oikoumenē*. Whether they can be identified with the Chinese or peoples from Central Asia in all cases is debated, especially in relation to Pliny's description of blue-eyed, red-haired Seres.[247] They are often said to be fantastically long-lived (up to 200 years), just, unwarlike, and shy of social intercourse.[248] The geographic location of these Seres was not always spoken of consistently. Horace places the Seres at the boundaries of the East, associating them with Bactria. Pomponius Mela places them near two islands called Chryse and Argyre (possibly eastern or south-eastern Asia), which Pliny also mentions, but he regards Chryse as a promontory of Serica. The author of the *Periplus* places the island of Chryse to the west of the Gulf of Bengal.[249] However, Pausanias notes that Serica is an island situated in the most remote location from the Red Sea, and that the inhabitants are of an Ethiopian race; but he also notes, accurately and for the first time, that silk came from insects and not plants.[250] Clearly there were a few ethnographic tropes about their justice, but beyond a very broad placement of

243 *Weilüe* 11—Trans. from Hill (2015); see also *Hou Hanshu* 88.11.

244 *Weilüe* 10–12, 22; *Hou Hanshu* 88.11–12.

245 For examples of this see, Hoppál 2011.

246 McLaughlin (2014): 209.

247 Pliny *NH* 6.24.88.

248 Pomponius Mela *Chorography* 1.11, 3.60; Pliny *NH* 6.24.88.

249 Horace *Odes* 1.12.55–56, 3.29.27–28; Pliny *NH* 6.54–55; *Periplus* 60, 63–64, 66.

250 Pausanias 6.26.6–9. See also Lucan *Pharsalia* (1.19–20) for the ambiguous juxtaposing of these peoples alongside references to the Armenians and those people living at the source of the Nile.

them in the East, the available sources do not seem to represent, as Robert's claims, an increasingly developed knowledge of these people. Nor is it possible to infer from these sources that the arrival of the "ambassadors" in China in 166 CE was purposeful.[251]

In spite of the rather vague and fantastical ideas that the Chinese had about the people of Da Qin and that the Romans had about the Seres, a few Roman goods did reach the Far East and Southeast Asia. At Oc Eo in Vietnam, a variety of Roman products have been found. Among these are glassware, gold and silver jewellery, gold coins with the portrait of Antoninus Pius (one of which was made into a pendant), coins of Marcus Aurelius, and also some precious gems (some with Roman motifs and styles). These were found alongside goods from China, Malaysia, and Thailand. The material at the site has generally been dated from the first to fifth centuries CE, although, on the basis of the coins, the Roman material seems to date from the second century onwards.

Other Southeast Asian sites with finds include Khuan Lukpad in southern Thailand, where beads similar to those from Arikamedu have been discovered alongside an unidentifiable Roman coin and two carnelian motifs, one showing the goddess Tyche. At a monastic site on the Mekong River, a Roman lamp (the "Pong Tuk lamp") was identified. A coin of Emperor Victorinus (268–70 CE) was found at U-thong (Thailand), and an intaglio with Perseus and fragments of Roman blue glassware were found at Khlong Thom (Thailand).[252] Roman coins also made their way to China, though these are predominantly Late Antique and Byzantine coins (about 100 coins, genuine issues and imitations), while those connected to the Principate appear to have been brought over by modern travellers.[253]

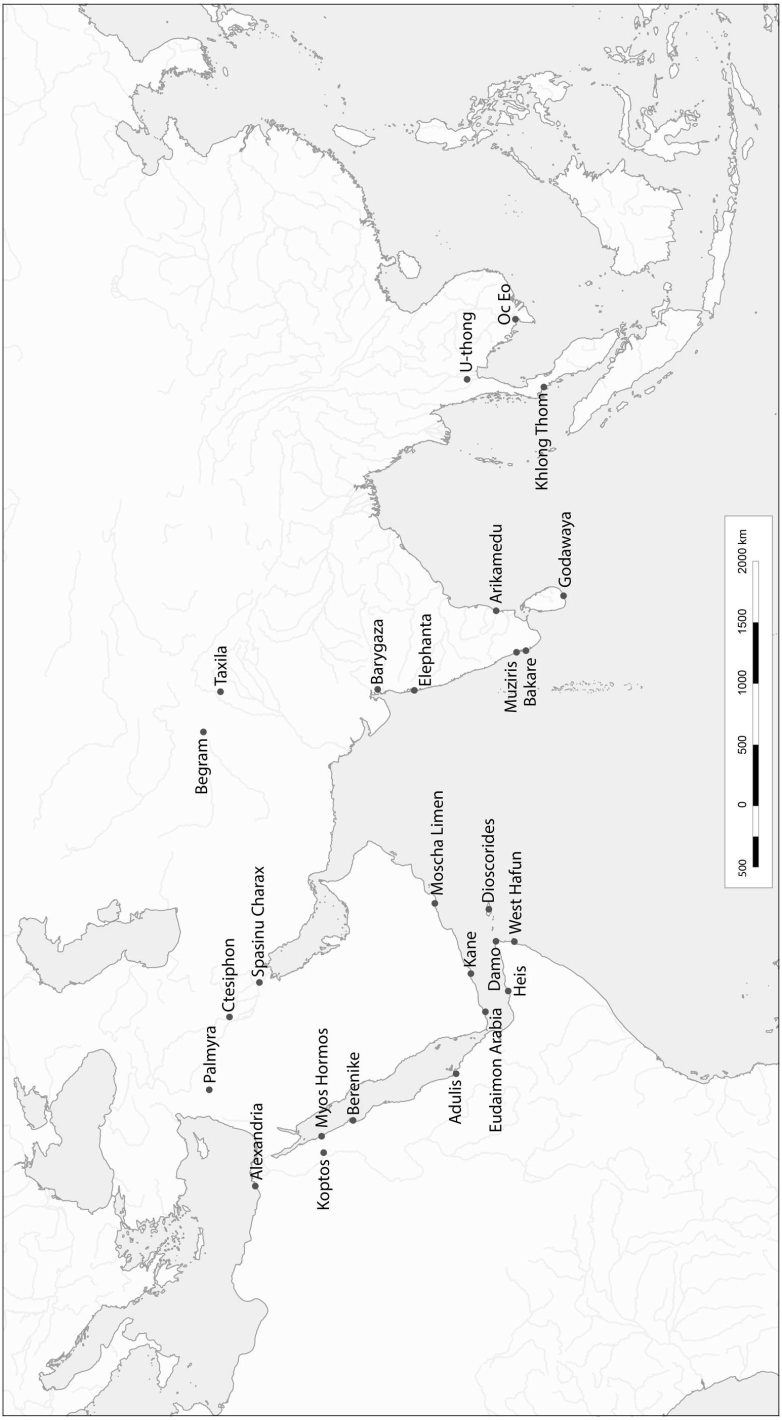
These archaeological finds should not necessarily be taken as proof that Romans directly visited Southeast Asia with great frequency. There is plenty of evidence for the existence of trade networks connecting south-eastern India with Southeast Asia. These networks had been in development prior to the first millennium CE, as is apparent from material culture, coinage, and Buddhist influences.[254] Arikamedu in particular shows well-attested trade connections with Southeast Asia, and may even have been responsible for the diffusion of

251 Robert (1997): 12, 79–80, 83.

252 Glover (1996a): 134–135; Glover (1996b): 374–375; Hall (1999): 444–445; Smith (2009): 115–116.

253 Li (2015): 279–290.

254 Mitchiner (1991): 62–68; for literary texts relating to Indian-southeast Asian trade see—*Jatakas* 3.360, 4.442; *Arthasastra* 2.11.59. See also Hall (1991): 100; Glover (1996a): 150–151; Glover (1996b): 392; Suresh (2004): 92; McGrail (2004): 291; Chew (2015): 41–50.



MAP 5 *The wider Indian Ocean*

beadworking techniques in the region.[255] It is far more likely that Roman goods reached Southeast Asia via intermediaries, just as Eastern commercial products could be acquired in Indian ports, like turtleshell from Chryse at Muziris and Bakare.[256] The author of the *Periplus* explicitly refers to boats from the south-eastern Indian ports of Kamara, Poduke (Arikamedu), and Sōpatma sailing not only to Limyrikē (on the Malabar coast) but also to the Ganges region, and across to Chryse (vaguely eastern or south-eastern Asia).[257]

The possibility that a few Roman merchants risked passage across the Bay of Bengal is not denied, but it is very likely that such occurrences were infrequent. Those Roman goods that did end up in the East are likely to have arrived as a result of pre-existing commercial networks connecting India with Southeast Asia. Those Roman merchants who did choose to undertake such a journey would have to sail in accordance with the rhythms of the monsoon winds in both the Arabian Sea and the Bay of Bengal. The Northeast Monsoon made sailing close to the east coast of India from October to December very hazardous.[258] It was typical for traders crossing the Bay of Bengal to set out from eastern India during October, November or December, and to return from Southeast Asia between April or May and September.[259] Consequently, if merchants from the Roman Empire wished to trade in the Bay of Bengal, it may have been a few years before they could return to Egypt.

Summary

The evidence for the routes and sailing schedules utilised by Roman merchants has shown that, with strict adherence to seasonal wind patterns, a circuitous exchange of goods between Alexandria and the ports of western India, southern Arabia, and East Africa (not beyond the Horn) could be achieved. However, distinct seasonal weather patterns in the Mediterranean and the western Indian Ocean meant that if any Italian merchants and financiers were engaged in vertical integration it would likely take 13 to 20 months before they saw a return on their initial investment. The distinct seasonal patterns between these two trading spheres also meant that the flow of Western Mediterranean goods

255 Francis (1991): 40; Francis (2004): 450–479, 502, 513–514; see also Ramali et al. (2011).

256 *Periplus* 56.

257 *Periplus* 60. The author (63) describes Chryse as the furthest land east. On Chryse and the Golden Chersonesos see Wheatley (1961); Van der Meulen (1974).

258 McGrail (2004): 250; see also Schoff (1917): 241–242; Kearney (2004): 11.

259 Tripati (2011): 1084–1085.

to India may have been subject to a greater degree of fluctuation. This would need to be mitigated by advanced planning and the warehousing of goods, a practice for which there is some evidence.[260]

The seasonal monsoon winds of the Indian Ocean offered a fairly limited window (around late September to early January) for Roman merchants to conduct their business and ensure a safe return voyage for that season. However, the more wealthy and powerful financiers and consortia may have had agents or colleagues resident in ports along the East African, southern Arabian, and Indian coasts. These individuals could obtain goods in advance, maintain links with local merchants and suppliers, and more readily react to changes in supply and prices. There is good evidence for the presence of Indian and Arabian merchants at the Red Sea ports. The existence of Roman diasporas at Arabian and Indian ports is also quite likely. What is more doubtful is the notion that some Roman merchants travelled far inland and integrated into local communities.

Merchants from the Roman Empire were clearly active in the western Indian Ocean alongside other groups. Some Roman merchants were even adventurous enough to operate in the Bay of Bengal, sailing to ports on the eastern Indian coast and as far afield as Southeast Asia. However, the available evidence suggests that this was probably not on a significant scale. The identifiable Roman material discovered in parts of Southeast Asia is far more likely to have gotten there as a result of long-established indigenous trade networks, rather than by direct contact with Roman merchants.

260 On the Horrea Piperataria see Houston (2003); Evers (2016): 68–74. The Nabataeans also stored goods, possibly as a means of influencing supplies and prices in their main selling markets—Hull (2008): 287.

CHAPTER 6

Imports

In the preceding chapters, the historical and geographical context of Mediterranean integration into the Indian Ocean trade has been considered, as have the networks, organisation, and participants. Here the focus shifts to the types of goods being acquired, the volume in which they were imported, and the impact these imported Indian Ocean goods had on Roman society. In terms of the first issue, written and material evidence reveal a very wide range of goods being traded. In a number of cases, this evidence provides mutual corroboration, such as the repeated literary references to the importation of black pepper and the numerous finds of black peppercorns at the harbour of Berenike. Indeed, while organic material still remains underrepresented in the archaeological record due to its perishable nature, recent excavations have allowed for a fuller picture, particularly at Berenike and Myos Hormos.

The lack of quantitative data prevents us being able to obtain precise estimates for the importation of certain Indian Ocean goods. Consequently, it is often necessary to interpret the impressionistic statements of the literary sources to get a sense of their popularity. Archaeological evidence is also available for interpretation but this is not without its problems. As previously discussed, the evidence may be skewed towards areas where more intense excavations have taken place, while certain materials survive better in the archaeological record than others. This means that any attempt to extrapolate universal figures for the volume of imports is not sustainable using such an approach. However, it is possible to get a sense of the importance of certain goods within a particular site by comparing their relative numbers and dating. It also indicates which goods were being brought to a particular region in certain periods (though dates can often be broad).

The literary sources do, however, provide ample evidence for the perception and reception of these goods. This has fed into a wider debate about the extent to which some of these Indian Ocean imports should be classed as luxury items or necessities. It is argued here that many Indian Ocean goods defy the application of fixed labels and could be used in important social functions while simultaneously acting as markers of status (especially when used lavishly). The literary sources, despite their limitations, also permit discussion of the popularity of certain Indian Ocean goods in Roman society and how far down the social scale their consumption may have spread. In particular, Pliny's list of prices for various plant products at Rome raise questions about the ubiquity of certain spices and aromatics.

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Imports from the Indian Ocean

The following discussion is not intended to provide an exhaustive list of every item that was imported, although it is hoped that glaring omissions are avoided. What it does aim to do is explore the nature of the goods imported. In this regard, the focus is on categorising them by type rather than geographic origin, though the latter is discussed. All taxonomies are inevitably selective and imperfect. Nevertheless, the aim has been to find a balanced categorisation of these goods based on both their material composition and varied social functions. Inevitably, some goods could fit into multiple categories, but to avoid repetition a choice has been made.

Staples, Foodstuffs, and Drinks

This may seem an unlikely category, given the traditional perception of the Indian Ocean trade as one of luxuries primarily consumed by the elite. To be sure, some items could be characterised as delicacies, such as cumin, possibly from India, and the probably spurious Indian mushroom spawn mentioned in Petronius' *Satyricon*.[1] What is more ambiguous is the import of certain grains. Pliny mentions the import of sesame, rice, and bulrush millet, while the author of the *Periplus* also mentions rice.[2] Rice has certainly been found in archaeological layers at Berenike, though, as noted in Chapter 5, this could have represented supplies for resident Indian merchants, as well as a being a genuine import. Neither Pliny nor the author of the *Periplus* give a sense of whether these goods were perceived as delicacies or basic staples in any given context. Casson has argued that merchants from the Roman Empire would not have wasted space on 'cheap mundane staples' and that the primary motivation of the trade was for high-value goods.[3] Nevertheless, discoveries of rice at the Red Sea ports and references to it in the literary sources suggest that it was imported to some extent.[4]

In fact, archaeobotanical finds unearthed at the Red Sea ports in the last few decades indicate that foodstuffs were more common than Casson assumed. Desiccated traces of coconut, tamarind, and sorghum seeds have been found at Berenike (coconut at Myos Hormos also); the former probably came from India and the latter two from Sudan or Ethiopia.[5] On their own, these finds do

1 Persius 5.55 (cumin seeds); Petronius *Satyricon* 38.

2 *Periplus* 14, 31, 32; Pliny *NH* 18.10.55, 22.96.

3 Casson (1989): 16.

4 Bakels and Jacomet (2003): 547–555 (rice finds); Pliny *NH* 18.22.96; *De Re Coquinaria* 2.2.7–9.

5 Cappers (2006): 73–79, 125–128; Van der Veen and Morales (2015): 56–57.

not indicate whether they were seen as “staples” or more prestigious imports, but the frequency of coconut finds and sorghum throughout layers at Berenike at least indicate popular consumption at this port.

Occasionally, some foodstuffs may have been consumed as a by-product. This is possibly the case with the meat of sea turtles at the Red Sea ports or in the Empire during the early Roman period, though there is a lack of literary testimony. Nonetheless, Cosmas does mention its consumption by at least the sixth century CE.[6] The carapace of a sea turtle has been found at Myos Hormos, as have worked shells at Berenike, though these finds do not necessarily prove the importation of live turtles.[7] However, reference by Galen to the use of tortoise blood and turtle bile in medicines may indicate that live specimens did make it into Mediterranean markets.[8]

Textiles and Clothing

There are no recorded figures for the volume of textiles and clothing imported via the Indian Ocean, but the *Periplus* indicates that several different types of fabrics were available. The types of fabrics that were used, the addition of dyes, and the fineness and sophistication of the weaving are likely to have affected the prices. It is most probably the case that prices for textiles fluctuated widely, as shown by medieval, Renaissance and other pre-Industrial evidence.[9] The variation in quality is evident from the literary sources. The author of the *Periplus* mentions a variety of cotton cloth at Barygaza called *molochinon* (a coarse fabric).[10] This item’s lower quality suggests it was intended for individuals of lesser economic means or for other utilitarian purposes, but this is a matter of speculation. Strabo states that cotton was often thought of as very similar to wool, and Pliny described cotton as being an expensive, linen-like fabric.[11] These rather vague descriptions indicate the potential range of qualities and costs associated with different cotton products.

The author of the *Periplus* indicates that cotton was widely available in India, including at Barygaza (northwest India), Argaru (on the Coromandel Coast), and in the Ganges region.[12] It is highly prevalent among the textile finds at

6 Cosmas *Christian Topography* 9.336.

7 Wattenmaker et al. (1979): 250 (Myos Hormos); Van Neer and Ervynck (1998): 365; Sidebotham and Zych (2012b): 140 (Berenike).

8 Dalby (2003): 329; Athen. 337b; Galen *SF* 12.310.

9 Chaudhuri (1985): 182–184.

10 *Periplus* 48–49, 51.

11 Strabo 15.1.21; Pliny *NH* 12.21–22.38–39.

12 *Periplus* 48, 51, 59, 63.

Berenike (linen and wool are also present).[13] While nothing can be asserted definitively, the literary testimony and the finds at Berenike suggest that cotton products were probably available on a regular basis in the largest urban centres of the Roman Empire. It is, however, necessary to bear in mind that Egypt produced some of its own cotton and so not all cotton products in the Empire were necessarily derived from imported material.[14]

Other imported textiles include Seric pelts (Σιρικὰ δέρματα), which were available from the port of Barbarikon according to the author of the *Periplus*.[15] Pliny also refers to Seric gowns or skins (*Sericis vestibus*, *pellis*), possibly the same product mentioned in the *Periplus*, and claims that they were the most expensive animal skin one could buy.[16] As discussed in the previous chapter, the ancient sources are rather vague in their identification of the geographic origins of the Seres. Liu has suggested that these skins were products of the Central Asian steppes, since they were available at the port of Barbarikon, near the Indus.[17] But given the vague notions about their origins, nothing can be said definitively. In Diocletian's *Edict of Maximum Prices* it is apparent that leopard and lion skins could be purchased.[18] Since the so-called Alexandrian Tariff mentions the import of these animals during the second century CE, it is very likely their skins were also available at this earlier period.[19]

Silk derived from China was highly sought after by Roman merchants. The author of the *Periplus* records its availability at various Indian emporia, including the Barbarikon, Barygaza, Muziris and Bakare.[20] There are several means by which Chinese silk reached India, including the overland silk routes to northwest India and the Ganges region. It is also likely to have been transported to southern India by sea lanes from the Malay Peninsula.[21] However, the likelihood of Indian silk production is increasingly being acknowledged. It is therefore possible that not only Seric, but also Indian silk was imported into the

13 Wild and Wild (1996): 246; Wild and Wild (2000): 264.

14 Pliny *NH* 19.2.14–15. Warmington (1928): 210–212, sees Indian cotton as higher quality and used for clothing. Nevertheless, Raschke (1975): 245, cites evidence for Egyptian cotton being used in textiles production—*P.Iand* VIII.142, *SB* VI.9025, 9026.

15 *Periplus* 39.

16 Pliny *NH* 34.41.145; 37.78.204.

17 Liu (1988): 9.

18 *Edict of Maximum Prices* 8.39–41.

19 *Digest* 37.4.16.7 Marcianus 1.S. *de delatoribus*.

20 *Periplus* 39, 49, 56.

21 Ferguson (1978): 585–591; Raschke (1978): 605–650; Seland (2010): 61; Hildebrandt and Gillis (2017).

Roman Empire.[22] Whether Seric or Indian, these silks should not be confused with so-called Coan silk. This "silk" is often assumed to be the product of one or two moths found mostly in south-eastern Europe, namely the *Saturnia pyri* and the *Pachypasa otus*.[23]

The literary sources give the impression that silk was popular but controversial among the elite in Roman society. Pliny bemoans the fashion of some men wearing light silk clothing in the summer. For some conservative members of Roman society it had connotations of sexual transgression, and in a senatorial decree of 16 CE, men were notionally forbidden from wearing it. However, by Pliny's time (early Flavian period), this ruling had elapsed or was at least widely flouted. Indeed, the emperor Gaius (r. 37–41 CE) is said to have worn silk.[24] Its importance as a trade item is mentioned both in the Indian *Kautilya Arthasastra* and Clement of Alexandria's *Paedagogue*.[25]

It has been asserted that silk was rarer and more costly than cotton.[26] Given the attention silk received in the literary sources, this seems like a reasonable assumption. Seneca complained that silk was imported at vast expense from unknown lands.[27] The evidence from Diocletian's *Edict of Maximum Prices* also seems to reflect this distinction, since silk weavers received several times as much pay as cotton workers. Like for like, silk items also appear much more costly.[28] However, imposing a rigid dichotomy between lower-value cotton and higher-value silk would be a mistake. The quality of the fabric and the weaving, as well as the dyes used on the fabric, will have impacted on the value of different silk or cotton products. Raschke has forcefully argued that earlier assumptions about silk being valued at its weight in gold are erroneous and based on a misinterpreted reference from the *Historia Augusta*, where the pur-

22 Kenoyer (2017): 18–24. In this regard, it is also worth noting that analysis of textile evidence (particularly connected to funerary contexts) from Palmyra has revealed a few specimens of silk that were produced in a manner suggesting an origin west of China—Seland (2016a): 29–30.

23 Raschke (1978): 623 n. 280. For a more sceptical view on the production of this "Coan silk" in the Mediterranean in Antiquity, and whether this product was in fact silk, see Hildebrandt (2017): 35–37.

24 Cass. Dio 57.15; Pliny *NH* 11.27.78; Suet. *Calig.* 52.1; Tac. *Ann.* 2.33; Parker (2002): 60–61; see also Seneca's (*Ben.* 11.27) condemnation of married Roman women wearing silk.

25 Sidebotham (1986): 24; Clement of Alexandria *Paedagogue* 2.10.107.3; *Kautilya Arthasastra* 2.11.107–114.

26 Schoff (1912): 194, certainly felt this to be the case; *contra* Bernstein (2008): 2.

27 Sen. *Ben.* 7.9.

28 *Edict of Maximum Prices* 20.1–13, 21.1–6, 23.1–2, 24.1–16, 25.1–9. For a discussion of silk prices in the Roman Empire see Hildebrandt (2017): 37–38.

ple dye greatly added to its cost.[29] The fact that other groups besides the elite wore silk as well, including prostitutes, suggests a fair degree of desirability and availability.[30] Also, its lightness meant only a small weight needed to be purchased to provide sufficient fabric for individual items of clothing.[31]

The Muziris Papyrus may or may not provide some indication of the relative cost of textiles, depending upon how one interprets the term *schida*, which has been understood to refer to either cloth, ivory tusk fragments, or ivory trimmings.[32] It is possible to reconstruct the price per *mina* of weight for *schidai* from this document. This product weighed 790 pounds altogether and was valued at 1592 *drachmae* and three obols for the assessment of the *tetarte* (which most likely represents wholesale prices in Alexandria). This has been worked out to equal the value of 70 *drachmae* (17.5 *denarii*) per *mina* (436 grammes) of weight.[33] To put this in context, Pliny reports that long pepper could be purchased for fifteen *denarii* per *libra* (323 grammes).[34] Of course, since the precise meaning of *schida* remains contentious such calculations are of limited value.

Bulk Goods: Non-precious Metals, Woods, and Stones

Metals, woods, and marbles are obviously different materials derived from different sources, but they have been incorporated here as one group, given that they are usually bulky and heavy. Some have marginalised the importance of bulk goods for the Roman market, relegating their exchange to Arabian and Indian merchants.[35] However, pre-industrial merchant shipping had two major concerns when sailing. The first was to stabilise the ship by ensuring that a sufficient quantity of bulk goods were available to counterbalance a cargo of light, high-cost items.[36] The second was to have a mixed cargo which ensured at least some items would sell—perhaps limiting profit, but also reducing risk.[37]

29 Raschke (1978): 624; *SHA Aurelian* 45.4–5. See also Seligman (1939): 554; McLaughlin (2014): 207; Liu (2017): 3; Hildebrandt (2017): 38–40.

30 Olson (2008): 95; Sen. *Con.* 1.2.3, 2.7.4; Juvenal 11.171–173.

31 Raschke (1978): 624–625.

32 Harrauer and Sijpesteijn (1985): 148–149 (cloth); Casson (1989): 35 (cloth); Rathbone (2000): 44–45 (tusk fragments); De Romanis (2014a): 1–34; De Romanis (2015c): 369–380 (trimmed tusks).

33 *P. Vindob* G 40822 verso, col. 2, 1–3, 10–15, 20–26; Casson (1989): 35; Young (2001): 67; De Romanis (2012b): 85–88. This is on a ratio of 4 Egyptian *drachmae* to one *denarius*.

34 Pliny *NH* 12.14.26–29.

35 Casson (1989): 21; Smith (2009): 90.

36 Chaudhuri (1985): 184; McGrail (1989); Cappers (2006): 165.

37 McPherson (1993): 82; Morley (2007): 31.

The literary sources clearly indicate that these bulky materials were imported alongside the lighter, and potentially more expensive, objects. However, as usual, there is little indication of the level of demand. It would be a mistake to imagine that only cargoes of precious gems and spices were carried on Roman merchant vessels.

References to the import of non-precious metals are fairly limited. The author of the *Periplus* states that Indian iron was in demand in East Africa, but says nothing about its demand in the Roman Empire.[38] However, by the second century CE, Indian iron and steel were evidently being imported frequently enough for them to be taxed by the authorities.[39] On the basis of one Augustan and one Tiberian *denarius* discovered at the site, Suresh argues that iron and steel produced at Kodumanal (Coimbatore-Erode) may have been exported to the Roman Empire, perhaps via Muziris.[40] However, these two surface finds can reveal nothing beyond the potential use of Roman coins as a means of exchange in the Kodumanal area, and not necessarily where the iron and steel were actually sent.

Various types of wood were imported into the Roman Empire as a result of the Indian Ocean trade. These woods, although bulky, were seen in many contexts as exotic, high-value items.[41] Aloe wood and ebony are both mentioned as imports from India.[42] Ebony was reportedly burnt for its aromatic qualities and used for making furniture.[43] Teak has been found in some quantity at Berenike, although often in a recycled capacity. It is difficult to discern whether teak was normally available for commercial sale in the Roman Empire. Sandalwood, baobab wood, and bamboo have also been found at Berenike, but the bamboo may have been intended mainly for making transport containers or other functional items.[44]

The *Periplus* records the import of a material called *lygdos*, which has been interpreted as marble or gypsum alabaster. Casson and Huntingford claim it

38 *Periplus* 6.

39 *Digest* 39.4.16.7 Marcianus 1.s. *de delatoribus*. See also Bopearachchi (1999): 16; de Saxcé (2015b): 62.

40 Suresh (1992): 12–13; Suresh (2004): 31–32.

41 Hardwoods were often used to make sophisticated and high value furniture—see Ulrich (2007): 235–240.

42 Pliny *NH* 12.8.17, 9.20 (aloe and ebony); Strabo 15.1.37 (ebony); Virgil *Georgics* 2.116–117 (ebony).

43 Pliny *NH* 12.9.20 (perfume and medicine); Vergil *Georgics* 2.117 (ebony couches).

44 Sidebotham (2011a): 230, 240. Casson (1982): 181–183, emends the text to ζύλων σαγαλίνων (referred to in *Periplus* 36) to mean teak rather than sandalwood.

refers to marble, although Schoff and, more recently, Wendrich and others have argued that it refers to gypsum alabaster, since Yemen is better known for this product.[45] The *Periplus* states that *lygdos* came from the port of Muza.[46] The use to which this product was put in the Roman Empire is not made clear, but it seems probable that it served as material for sculpture or ornate building construction. However, Pliny mentions that Arabian white stone was ground down to form a sort of toothpaste, indicating that such products had uses beyond what might be immediately assumed.[47]

Plant Products: Spices, Aromatics, Toiletries, Drugs, and Dyes

Spices and aromatics are often regarded as one of the most if not the most significant class of goods imported via the Indian Ocean. Raschke has argued that the supposed 'outflow of wealth' from the Empire to the East was a result of the purchasing of spices, not silks.[48] De Romanis has also suggested that some of the larger ships were designed to accommodate the import of huge quantities of black pepper (and after this malabathrum), drawing parallels with later Portuguese history.[49] There was certainly an aromatics warehouse at Berenike, as revealed in an inscription set up by a secretary in charge of this facility (112/113 CE).[50] Despite the lack of quantitative data, the sheer number of literary references places it beyond doubt that spices and aromatics were heavily in demand. This is unsurprising in light of the fact that spices remained a preeminent feature of the Indian Ocean trade until the seventeenth century.[51]

The various use of spices in religious rituals, medicines, and cooking is a major reason why they have been regarded by many as non-luxury products. Sidebotham even suggested that the absence of black pepper and frankincense in the "Alexandrian Tariff" reflected extensive consumption by a wide-ranging spectrum of the Roman population.[52] These products were widely consumed, although it is difficult to tie the "Alexandrian Tariff" exclusively to trade through the Red Sea, given it also refers to items from the Levant and North Africa.[53] It

45 Casson (1989): 64–65, 156; Huntingford (1980): 34, 141; Schoff (1912): 31, 114; Wendrich et al. (2003): 58.

46 *Periplus* 24.

47 Pliny *NH* 36.41.21.

48 Raschke (1978): 650; also Raschke (1975): 245.

49 De Romanis (2015b): 134.

50 Sidebotham (2015a): 10–11.

51 Keay (2005): 213–215, 249–256; Gilbert and Reynolds (2006): 42–43.

52 Sidebotham (2011a): 225, 249–251.

53 *Digest* 39.4.16.6–7 Marcianus *1.s de delatoribus*. A later document from the Thebaid (fourth

is also not clear why certain goods were included or excluded. In contrast to Sidebotham's view on the widespread consumption of spices, Keay asserts that they were not vital in any sphere, with the possible exception of medicine, making them attractive as status markers since they were '[r]are enough to imply distinction and distinct enough to be unmistakable'.[54] Both views have merit, but as will be seen below, these goods could be utilised and viewed in a range of ways that complicate any luxury versus non-luxury distinction.

In terms of acting as a practical necessity, the idea that spices were used in preserving meat or covering up a rancid taste has proved highly controversial. Those who are sceptical of these theories question why such comparatively expensive spices (compared to salt) would be used as preservatives or to cover up the taste of rotting meat. They have also questioned whether spices would actually be effective.[55] On this latter point, however, recent research has shown that spices do have preservative qualities, with antimicrobial properties killing food-spoiling micro-organisms.[56] Whether the Romans ever conceived of the use of spices primarily for such preservative qualities (as opposed to this being an incidental benefit), or were even particularly cognizant of this, is open to debate.

Ancient literary descriptions of certain plants and their various parts (stalks, leaves, roots, seeds) have often posed a problem for modern scholars when attempting to securely identify them.[57] For instance, many regard the cardamom of the ancients as corresponding to the modern product, whereas the identity of the ancient amomum has generated much debate.[58] Identifying the origins of certain plants is also fraught with difficulties. In the case of cassia, cinnamon, and ginger, it is not entirely clear whether these spices were transhipped, had been transplanted from South Asia but died out, or, as some assert, were different plants from those known today.[59] Transplantation is less likely to be the case for cinnamon and cassia plants, since they required more moist

century) notes taxes on pepper in Alexandria, potentially raising doubt over its exemption from taxation—Evers (2016): 110.

54 Keay (2005): x–xi; see also Dalby (2000a): 124, 156; Gilbert and Reynolds (2006): 29; and Stearns (2006): 3.

55 On this debate see Dalby (2000a): 156; Freedman (2008): 3–4; Gilbert and Reynolds (2006): 23, 26; Keay (2005): 27–28; McLaughlin (2014): 184; Gurukkal (2016): 130.

56 Van der Veen (2011): 65–66.

57 Czarra (2009): 9; Dalby (2000a): 156; Keay (2005): 36; Gledhill (2008): 1–3, 11. See also Casevitz (1995): 21–26, for the transmission of Indian names for plants/spices into Greek.

58 Dalby (2000a): 102.

59 Casson (1989): 122–124, (first theory); Dalby (2000a): 21–26 (ginger—middle theory), 36–41, 156–157 (cinnamon and cassia—first theory); Groom (1981): 85 (latter theory); Hunting-

conditions than were suitable in East Africa or Arabia. But the exchange of these plant products by many hands is quite plausible in light of the commercial links between Southeast Asia, Sri Lanka, and eastern India.[60] The fact that many plant products were acquired from major ports, and not directly from the regions in which they were grown, exacerbates the confusion in the ancient sources. This is apparent from the persistent belief that Arabia not only produced frankincense and myrrh, but also cinnamon, cassia, and nard.[61]

This confusion can be seen in the conflicting statements of Strabo, Pliny, and the author of the *Periplus* about the availability of frankincense and myrrh. The *Periplus* makes it clear that frankincense and myrrh were available at many ports in East Africa and the southern Arabian Peninsula.[62] Strabo, deriving his information from Agatharchides, stated that Cattabania produced frankincense and Chatramotitis myrrh, while the Sabaeans also produced frankincense and myrrh.[63] Pliny claimed that while myrrh was available in Trog(l)odytica and Arabia, frankincense was only available in Arabia.[64] Modern botanical studies show that myrrh grows in both East Africa and southern Arabia, while the high-quality frankincense familiar to us (*Boswellia sacra*) derives from southern Arabia, with other varieties also to be found in East Africa and India.[65]

The muddled details in the ancient sources may arise from the lack of ability to distinguish between different types of subspecies, but the strong association of frankincense with southern Arabia is also likely to derive from its prominent role in the incense trade. Petrographic and chemical tests undertaken on rocks found in the harbour of Myos Hormos have shown that 70 per cent came from the area around the ancient port of Qana', on the coast of Yemen,

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ford (1980): 134 (latter theory); Keay (2005): 44 (first theory); Miller (1969): 42–47, 74–77 (first theory); Seland (2010): 40–41 (latter two theories); Raschke (1978): 652–655 (latter theory). See also Pliny *NH* 12.42.19, for the "cinnamon route". De Romanis (1996): 33–70, takes the view that the product that the Greeks knew as κινάμωμον (*kinamōmon*) in fact derived from a plant growing in East Africa or Arabia. *Contra* Lytle (2016): 123–130, who argues that cinnamon and cassia came from Southeast Asia and were brought (perhaps directly) to Somalia (not Madagascar and Rhapta) or Southern Arabia.

60 Casson (1984): 237; H. Ray (1994): 56.

61 For example Agatharchides 99b + c = (b) Diod. Sic. 3.46.1–5 = (c) Strabo 16.4.19; Dioscorides *MM* 1.12; Stat. *Silv.* 4.5.30–32; Arr. *Anab.* 7.20.

62 *Periplus* 7–12, 24, 28.

63 Strabo 16.4.4; Agatharchides 5.99c = Strabo 16.4.19; Groom (1981): 109, notes that Strabo inverts Cattabania (Qataban) with Chatramontitis (Hadramawt).

64 Pliny *NH* 12.51–52.30.

65 Groom (1981): 114; Sidebotham and Zych (2011b): 57; Zieliński (2011): 61.

and 30 per cent came from Aden, while analysis from Berenike has shown that they primarily derive from Qana'. These rocks were probably used as ballast by ships bringing cargoes of incense from those ports to the Red Sea.[66] Indeed, the remains of a large amount of burnt incense found in several storage rooms at Qana' seem to strengthen this theory.[67] Furthermore, the aforementioned discovery of the word Šaqr (the name of the royal palace at Shabwa) at Berenike, Myos Hormos, and Qana' may imply the Hadramawti monarch's participation in the incense trade (via agents).[68]

It is not always possible to corroborate statements made in the literary sources with the archaeological evidence. In some cases, the absence of the latter is seen to undermine the explicit testimony of the former. This is apparent when considering the import of long pepper, which is plainly said by the author of the *Periplus* to derive from northwest India.[69] Its absence in the archaeobotanical record at Berenike has suggested to some that there was a lack of direct trade between Roman Egypt and northwest India.[70] It has also been purposed that long pepper may not have been transported by sea, due to its susceptibility to mold and spoilage.[71] However, there is evidence that at least as early as the third century BCE the Nabataeans were acquiring long pepper via the Gerrahaeans, who received it as a result of the seaborne trade via the Persian Gulf.[72] Some material deriving from the northwest Indian subcontinent has also been found at Berenike, including reed matting, bamboo (possibly for awnings or sails), and semiprecious stones like lapis lazuli. But in support of the above theory, Sidebotham has suggested that these items arrived not as the result of direct contact with Roman and north-western Indian merchants, but by transshipment.[73]

There may be some merit in this view, but it still leaves open the question of how to interpret the direct testimony of the *Periplus* about the exchange

66 Peacock, Williams, and James (2007): 28–70; Sidebotham and Zych (2010): 12–13. Some of the frankincense that arrived at the Red Sea ports seems to have been made use of in the Eastern Desert region. An ostracon from Didymoi refers to a request for three staters of frankincense at this fortlet—*O. Did.* 232—Bülow-Jacobsen (2012): 240–242.

67 Sedov (1992): 112–116; Sedov (2007): 90–91.

68 Sidebotham and Zych (2011b): 56–57; Sidebotham and Zych (2012b): 138.

69 *Periplus* 49, 56.

70 Cappers (1998): 311; Wendrich et al. (2003): 69.

71 Sidebotham (2011a): 224–225.

72 Durand (2009): 408–409—Diod. Sic. 19.94.10—based on Hieronymus of Cardia.

73 Wendrich et al. (2003): 54, 60; Sidebotham (2008): 308; Sidebotham (2011a): 240.

of goods in the northwest Indian subcontinent.[74] Certainly, the *Periplus* only attests to the existence of direct commercial contact, rather than revealing anything about the intensity of that contact compared to other regions of India. In this respect, the linguistic evidence and finds of Indian domestic wares at Red Sea ports (discussed in the previous chapter) demonstrate stronger connections with the south and southeast than they do with the northwest. One means proposed to explain this comparative paucity is to point to the Graeco-Bactrian and Indo-Greek legacy in the northwest Indian subcontinent. It is proposed that a familiarity with the Greek language and the possible adoption of Hellenic names while in Egypt make this group more difficult to identify. The Sophon who left a graffito at el-Kanais referring to himself as 'Ινδός' has been taken as proof of this.[75] There is certainly evidence for some continued Hellenic influence in the northwest with regards to artistic imagery and the use of Greek script and language on coinage. However, this should be seen in terms of adaptation and hybridity, rather than the preservation of something "purely" Hellenic.[76] It is also difficult to substantiate how many learnt fluent Greek. Whatever the extent of direct commercial contact between Egypt and the northwest Indian subcontinent, the importation of goods like long pepper should not be doubted.

Regarding the issue of the prices paid for spices and aromatics, it is fortunate that Pliny provides a fair amount of detail: a situation in sharp contrast to the generally patchy evidence for most other Indian Ocean imports.[77] Broadly speaking, spices and aromatics were much cheaper than the most expensive Indian Ocean imports, like precious stones and gems. For example, one rock-crystal ladle was said to have been worth 150,000 *sestertii* (37,500 *denarii*), whereas Pliny reports that frankincense, myrrh, bdellium, cardamom, ginger, and ladanum were available for between 2.5 and 16.5 *denarii* a *libra*, with varying prices depending upon the quality.[78] Black pepper was available for four *denarii*, while it was possible to get white pepper for seven *denarii* and long pep-

74 *Periplus* 38–49.

75 Whittaker (2004): 153; followed by McLaughlin (2010): 35–36; see also Sidebotham (1986): 100–101, who notes that Ινδός may designated a mahout or elephant driver (rather than an ethnonym).

76 For issues of identity in the northwest Indian subcontinent see Mairs (2014).

77 Pliny *NH* Book 12.

78 Pliny *NH* 37.9–10.23–29. For comparative medieval evidence see Geniza archive—TS 12. 693*v*, 11.9–16; also Freedman (2008): 115, on the fluctuating price of pepper at Alexandria in the fourteenth century. See Table 5.

per for fifteen *denarii* a *libra*.[79] Van der Veen and Morales have suggested that black pepper was traded in large quantities, given its high incidents in the material finds at Myos Hormos (a high "spillage" rate indicating both its commonality and its relative cheapness).[80] How widely these spices were consumed within Roman society will be discussed below. Pliny is not the only source on prices for certain plant products; the Muziris Papyrus reveals that containers of Gangetic nard were valued at 4,500 Egyptian *drachmae* each (mid-second century CE Egypt).[81] Unfortunately, the weight of these containers is not specified.

TABLE 5 *Pliny's prices for Indian Ocean plant products*

Commodity	**Type/quality**	**Price per *Libra***
Ammoniacum		2 *denarii*
Amomum	Clustered	60 *denarii*
	Dust	49 *denarii*
Bdellium		3 *denarii*
Calamus		1 *denarius*
Cardamom	Green	3 *denarii*
	Red	
	Black	
Cassia	Best quality	50 *denarii*
	Lower qualities	5 *denarii* (variations in price)
Cinnamon		10 *denarii* (formerly as much as 1000 *denarii*)
Costus		5 *denarii*
Daphnitis (*isocinnamon*)		300 *denarii*
Frankincense	1st quality	6 *denarii*
	2nd quality	5 *denarii*
	3rd quality	3 *denarii*
Ginger		6 *denarii*
Hammoniaci lacrimas	Best quality	40 asses (2.5 *denarii*)
Ladanum		40 asses (2.5 *denarii*)

79 Pliny *NH* 12.14.26–29; long pepper (Barygaza), white and black (Muziris and Bakare)—*Periplus* 49, 56.

80 Van der Veen and Morales (2015): 57.

81 *P. Vindob* G 40822 Verso Column 2 lines 29–31.

Commodity	**Type/quality**	**Price per *Libra***
Malabathrum	Oil	1–400 *denarii* (broad range)
	leaf	60 *denarii* (generally)
Myrrh	Stacte	3–50 *denarii*
	Cultivated	11 *denarii*
	Erythraean	16 *denarii*
	Trogodytic	16 *denarii*
	Odoraria	14 *denarii*
Nard	Large leaf (*hadrosphaerum*)	40 *denarii*
	Medium leaf (*mesosphaerum*)	60 *denarii*
	Small leaf (*microsphaerum*)	75 *denarii*
	Spikenard	100 *denarii*
Pepper	Long	15 *denarii*
	White	7 *denarii*
	Black	4 *denarii*
Serichatum		6 *denarii*
Styrax		17 *denarii*
Sweet rush (Ginger grass)		5 *denarii*

It is difficult to know whether Pliny derived his information from official price regulations, observations on general market prices in Rome, or, as McLaughlin suggests, figures from the government's sale of its own products.[82] The latter idea is not impossible, since the government would have acquired substantial amounts of goods in kind while collecting the *tetarte* at Alexandria (of which it is possible that some stocks were shipped to Rome), but the idea remains speculative. With regard to the possibility of price regulations, the Roman state did occasionally fix prices as part of sumptuary measures, but this was often to suppress lavish expenditure, or possibly, in the case of Sullan legislation, to reduce the prestige value of certain items.[83] There is no evidence that such measures were taken with regard to spices or aromatics during the Principate. In a later

82 McLaughlin (2014): 193–194; *contra* Evers (2016): 71. On price regulations see Sidebotham (1986): 36 (and 45)—'If Pliny is, indeed quoting from a government decree this implies some government control of commerce and suggests that regulation was necessary to prevent prices from climbing too high; we are reminded of Diocletian's Edict of Maximum Prices two centuries later.'

83 For example, Suet. *Tib*. 39.1; Tac. *Ann*. 3.52. See also Wyetzner (2002): 15–33.

period, Diocletian did attempt to fix prices for various spices in his *Edict of Maximum Prices* (301 CE). However, some of these appear to be unreasonably low, leading Rathbone to argue this was not the result of greater availability, but rather the inability of the government to fix realistic prices, since the value of these products fluctuated so much.[84]

On balance, it is most likely that Pliny derived his figures as a result of observing the market prices for these aromatics and spices, or possibly, as Evers suggests, from consulting the *collegia* associated with their sale.[85] That there was little state interference (at least in the early Flavian period) in the pricing of these products is also suggested by Pliny's comments. He gives the impression that prices varied due to the quality of the plant products being sold, as well as their availability.[86] For example, he mentions that stacte myrrh sold for between three to 50 *denarii* per *libra*.[87] The leaves of malabathrum could sell for between one and 400 *denarii* per *libra*, while the leaf itself reached 60 *denarii*.[88] Furthermore, cassia had a wide range of prices, with the best quality selling for 50 *denarii*, and lesser qualities as low as 5 *denarii* per *libra*.[89] The instability of prices is also apparent from Pliny's account of an incident where a 50 per cent rise in the cost of cinnamon occurred due to the destruction of groves by marauding barbarians.[90] Fluctuating prices seem to be common in most historical periods for a variety of reasons, ranging from poor or abundant harvests, the loss of shipping at sea, and dearth or glut in various markets.[91] The medieval Geniza documents indicate that, even with an official market price, most traders buy and sell for whatever price they are able to obtain. Some of these documents also reveal fluctuating demands for pepper and how these could affect prices, even on a daily basis.[92] It is likely that in different periods there was a rough idea of what constituted a fair price, but that this would change over time. Nevertheless, even factoring in fluctuations, Pliny's figures give some idea of what were considered reasonable prices in early Flavian Rome.

84 Rathbone (2009): 320; Rathbone (2000): 47.
85 Evers (2016): 83–84.
86 Rathbone (2000): 47–48; Whittaker (2004): 172–174.
87 Pliny *NH* 12.35.70.
88 Pliny *NH* 12.59.129. Compare De Romanis' (2012): 85–88, calculation of 12 *drachmae* per *mina* (511 g) as assessed for the *tetarte* in Alexandria (this likely reflecting wholesale prices in the city).
89 Pliny *NH* 12.43.97.
90 Pliny *NH* 12.32.93–94.
91 Keay (2005): 220, 229–233; Cobb (2014): 108–109.
92 Goitein (1967): 44–45, 167, 218–219.

Slaves

The evidence for slave trade in the Indian Ocean is comparatively limited and has to be largely inferred from incidental comments in the literary sources. The author of the *Periplus* says nothing of slaves from India or Arabia, but mentions that they were available at the East African ports of Malao and Opone. In the case of Malao, he refers to the occasional export of slaves, though it is not made clear whether they were sent to Arabia or the Roman Empire, while from Opone, 'better-quality slaves' were sent mostly to Egypt.[93] Parker believes slaves from these ports were re-exported further down the African coast rather than brought back to the Mediterranean.[94] However, in the case of slaves from Opone, this is completely contrary to the testimony of the *Periplus*. Pliny also reports that slaves were available at the port of Adulis, but the extent to which they were imported to the Roman Empire is not stated.[95] It is likely that some slaves from East Africa were present in the Roman Empire, as one can judge from a reference in Petronius' *Satyricon* to two Ethiopian slaves serving wine at the banquet of Trimalchio.[96]

Secure evidence for the import of Indian slaves comes from the second century CE "Alexandrian Tariff", which mentions a duty on Indian eunuchs.[97] Occasional references to Indian slaves occur in a range of texts, including poetry, satire, and biography, which can be seen as implicit evidence for the existence of a slave trade, although not for the scale on which it took place. Horace speaks of slaves as swarthy Hydaspes (the modern Jhelum River, a branch of the Indus), while Tibullus mentions Roman women accompanied by Indian pages.[98] Philostratus, in his *Lives of the Sophists*, mentions that Herodes Atticus inherited from his friend and teacher Favannus of Arelate (c. 150 CE) an attractive black Indian slave, who amused his masters by speaking a mixture of Indian and Attic words.[99] In a more popular form, much amusement was had in the play *Charition*, where "Indians" would come on stage and babble in an unintelligible language. Some scholars have suggested these may have been genuine Indian slaves performing and have connected the "babbles" to transliterations of particular Indian languages. However, the current

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93 *Periplus* 8, 13.

94 Parker (2002): 50.

95 Pliny *NH* 6.34.172–173.

96 Petronius *Satyricon* 34.

97 *Digest* 39.4.16.6–7 Marcianus 1.s. *de delatoribus*.

98 Dalby (2000b): 191–192; Horace *Satires* 2.8.14; Tibullus *Elegies* 2.3.55–56.

99 Phil. *VS* 1.8; Schmitthenner (1979): 96.

lack of consensus and incomplete nature of the text makes such theories difficult to substantiate.[100]

There is a need for caution in accepting the ethnic labels and descriptions given in ancient literary sources, since they were frequently vague and imprecise. Many of the ancient literary sources gave a generalised representation of certain ethnic groups. This often involved a complex variety of perceptions, frequently quite contradictory.[101] This applies particularly to the opaque and often overlapping notions in many sources about Indians and Ethiopians.[102] That said, it is apparent from Philostratus' *Life of Apollonius of Tyana* that he is able to distinguish between Indians and Ethiopians, even if he placed the latter's origins within India.[103] It seems reasonable to assume that he is not mistaken about the identity of the slave inherited by Herodes Atticus in the *Lives of the Sophists*.

The scattered and varied literary references do attest to the import of slaves from places such as India and East Africa, but they do not give the sense that this was a trade conducted on a significant scale. It is known that slaves of "exotic" origins were often used to serve at banquets as a means of displaying economic and social status, and thus there may have been some demand for Indian and East African slaves.[104] However, these slaves are likely to have formed a very small minority of the overall slave population within the Roman Empire.

Animals

Scattered comments made in the literary sources reveal that exotic animals from places like East Africa and India were brought into the Roman Empire, although in a number of cases their geographic origins need to be deduced. The author of the *Periplus* does not mention the importation of live animals into the Roman Empire. It is possible that specialised shipping was needed to transport very large animals like elephants, as was the case in the Ptolemaic period. These large animals often formed an important part of public spectacles in the Roman Empire.[105] Pliny states that there were games that exhibited a one-horned rhinoceros (found in Asia, especially India) and two-horned

100 *POxy.* III. 413. For a discussion of these theories see E. Hall (2010).

101 Parker (2008): 95; see also Raschke (1975): 243.

102 Dalby (2000b): 178, 191, 93.

103 Phil. *VA* 3.20.1–2.

104 Dunbabin (2003): 156.

105 Dalby (2000b): 194; Horace *Epistles* 2.1.196; see also Pliny *NH* 8.1–11.1–32.

rhinoceroses (from Africa).[106] Whether these were acquired commercially or directly by the state is not specified, nor is it clear whether they were transported via the Indian Ocean or overland routes. Strabo also mentions large snakes coming from India, and Strabo, Pliny, Martial, Suetonius, and Cassius Dio all mention tigers. Claudius Ptolemy also mentions lions.[107] The fact that Strabo describes personally seeing a giant snake around nine cubits and one span long (over four metres) in Egypt suggests that such spectacles were popular.[108] The "Alexandrian Tariff" mentions the import of panthers and leopards, but it is not clear if any of these dangerous animals were ever kept as part of an elite or imperial menagerie, as opposed to just being used in public spectacles.[109]

Some animals were, however, clearly kept as pets or novelties, as well as being consumed at feasts. Pliny describes how parrots were brought from India and plied with drink to make them playful.[110] Various sources, including Ovid, Columella, and Pliny, also mention the peacock, both as a creature of beauty and something that was eaten at the banquet table.[111] Athenaeus claims that by his time (early third century CE) peacocks had become quite common in Rome.[112] These animals may not always have been imported as pure novelties; Dio Chrysostom, in his *Third Discourse*, describes the use of Indian hounds in hunting.[113]

Clearly, the written testimony (directly and indirectly) attests to the importation of a number of exotic animals. Some may have arrived into the Roman Empire via overland trade routes, but evidence from an animal necropolis at Berenike suggests that others were arriving via Indian Ocean trade networks. Finds include at least one baboon, as well as vervet (*Chlorocebus pygerythrus*) or grivet (*Chlorocebus aethiops*) monkeys.[114] These animals were proba-

106 Pliny *NH* 8.29.71.

107 Strabo 15.1.45; Pliny *NH* 8.29.71; Martial *Spect.* 8.26; Suet. *Aug.* 43; Ptolemy *Geog.* 7.2; Cass. Dio 54.9. For the wonder caused by such displays see Calpurnius Siculus *Ecologues* 7.23–38, 45–84.

108 Strabo 15.1.45.

109 *Digest* 39.4.16.7 Marcianus 1.s. *de delatoribus*. For domestic and wild animals roaming the land of Nero's Golden House see Suetonius (*Ner.* 31.2).

110 Pliny *NH* 10.58.117; see also Ptolemy *Geog.* 7.2 (white parrot); Martial *Apophoreta* 14.73; Aelian *NA* 16.2.

111 Columella *De Re Rustica* 8.8.10; Ovid *Amores* 2.6.1–2; Pliny *NH* 10.22–23.43–45; *SHA Elegabalas* 20.4.21.1.—see also Stat. *Silv.* 2.4; Martial *Apophoreta* 14.67.

112 Athen. 14.654 d–f; see Braund (2000): 10.

113 Dio Chrysostom *Third Discourse on Kingship*; Sidebotham (1986): 7.

114 Sidebotham (2015a): 21; Sidebotham (2017b): 63.

bly imported from East Africa—as seems to have been the case with the earlier Ptolemaic era import of primates (discussed in Chapter 2). Literary allusions and artistic representations of monkeys and apes suggest that the finds at Berenike should be seen as indicative of a wider demand for primates in the Roman Empire (even if in this specific context they may represent the pets of either local or temporary residents, or have been used in particular religious or magical rituals at the port).[115]

Precious Materials: Gemstones, Semiprecious Beads, and Animal Products

On the face of it, combining animal and geological products into the same grouping may seem odd, but they are in fact linked both by their high value and the frequency with which they were used as components of jewellery, furniture, and objects of art. For example, ivory and tortoiseshell were used in the making of couches and chairs, sometimes with encrusted gems, while ivory and precious gems could be crafted into gaming pieces.[116] There is in fact evidence for the manufacture of items made with mother-of-pearl, beryl, sard, and obsidian at Berenike, in the western part of the harbour (first and second centuries CE).[117] Such gemstones and animal products were no doubt more expensive than semiprecious beads that appear to have been created to emulate them, though at much less cost.[118] There is no systematic list detailing the prices of these precious materials, but there are various individual references that give a sense of the magnitude of their cost.

Beginning with animal products, one of the most widely used items was ivory. This was not solely acquired as a result of the Indian Ocean trade, but Pliny does note that it had become increasingly difficult to obtain in large quantities outside India—possibly a legacy of earlier Ptolemaic elephant hunt-

115 Martial *Ep.* 14.138; Apuleius *Met.* 11.8.1 (dressing-up monkeys/apes); Galen *De usu partium* 3.16; Clement of Alexandria *Paedagogus* 3.4.30 (apes as pets). For representations in art see, Lazenby (1949): 248.

116 Martial *Ep.* 9.59, 14.87 (tortoiseshell couch), 12.66 (jewelled couches with tortoiseshell); Martial *Apophoreta* 14.14 (ivory knucklebones); Pliny *NH* 37.6.13 (chessboard made of two precious stones); Propertius *Elegies* 2.24 (ivory dice).

117 Sidebotham and Zych (2010): 13, 21; Sidebotham and Zych (2011b): 49; Rądkowska and Woźniak (2011): 20, 22. Obsidian was likely being used as a cutting tool.

118 Pliny *NH* 35.48; 37.75–76.197–200, notes that people had to be on guard against fraudulent imitations of precious stones, no doubt worn by those of lower status—see Olson (2008): 46.

ing activity along the African side of the Red Sea and the Gulf of Aden.[119] The author of the *Periplus* appears to confirm this when reporting that ivory was only available in limited amounts at East African ports until one reached Rhapta, whereas he also notes its general availability in India.[120] The only distinctly Indian carved item in the Roman Empire identified so far is an ivory statuette of a female at Pompeii (possibly of Satavahanan origin).[121] A great deal of ivory was imported, unworked, to be carved as Roman fashions dictated, something which Ovid explicitly alludes to in the *Medicamina Faciei Femineae*.[122] Nevertheless, despite the singular nature of the Pompeii ivory, Evers has credibly argued from literary and epigraphic evidence that this piece may be indicative of a wider demand for imported Indian carved ivories to be worked into Roman furniture (at least in the mid-first to early second centuries CE).[123]

Figures from the Muziris Papyrus provide a snapshot of the value of ivory. The document states that good-condition ivory, weighing 78 talents and 54 ¾ *minae* (2125 kilogrammes) in total, was imported on the Hermapollon. It has been calculated that this ivory was valued at 100 *drachmae* (25 *denarii*) per *mina* (511 grammes) of weight, to judge from the rate of import duty.[124] These figures, of course, only represent the value at which it was assessed on arrival at the Red Sea ports (mid-second century CE), and not its retail value in the various urban centres of the Empire. A possible indication of the high value of ivory objects is indicated by one of the tablets from the archive of the Sulpicii. One

119 Pliny *NH* 8.4.7; Juvenal 11.122–127, speaks of the ivory from Syene, the moors, and the Indians. See Cobb (2016): 201–203; also Evers (2016): 17–18.

120 *Periplus* 3, 6, 7, 10, 17, 49, 56.

121 The figure from Pompeii has in the past been identified as Lakshmi, an Indian goddess of prosperity, and may have formed part of a handle or stool—P. Gupta (1991): 124; Cimino (1994): 119–122; Berry (2007): 200. *Contra* Evers (2016): 23–37, who suggests that this piece may not have served either function in its original context, but most likely was a 'decoration, with or without supporting effect, integrated into a larger piece of furniture'. This statuette is similar in style to some found at Begram, Bhokardan and Ter—Mehendale (2011): 137; Evers (2016): 36. Some have questioned whether this figure should be associated with Lakshmi—Parker (2002): 53–54.

122 Ovid *Medicamina Faciei Femineae* 10. See also the Muziris Papyrus for the importation of unworked ivory tusks (and possibly cuttings)—De Romanis (2014a) and (2015c).

123 Evers (2016): 37–52.

124 This is using the Egyptian talent—*P. Vindob* G 40822 Verso Column 2 lines 4–15; Young (2001): 67; this equates to 18.75 *denarii* per *libra*; see also Rathbone (2000): 48; De Romanis (2012b): 88.

contract, signed at Puteoli (August, 48 CE), involved a 58-*libra* piece of ivory valued at 900 *denarii* per *libra* (323 grammes), worth over 200,000 *sestertii* in total.[125]

Other much sought-after animal products were tortoiseshell and turtleshell. Indeed tortoiseshell is the most frequently mentioned product in the *Periplus*, said to be available from East Africa, southern Arabia, India, and the Far East.[126] If De Romanis' reconstruction of the fragmentary bits of the verso of the Muziris Papyrus is correct, then tortoiseshell was valued at 48 Egyptian *drachmae* (48 *sestertii*) per *mina* of weight, at least in the wholesale market in Alexandria (mid-second century CE).[127] Pliny purports that Carvilius Pollio was the first man to cut tortoiseshell into laminae and to veneer beds and cabinets with it (first century BCE). And by the reign of Nero, some ingenious individual had discovered how to make tortoiseshell lose its natural colour by painting it in imitation of wood.[128] Several scutes of turtle have been discovered at Berenike, with some showing evidence of being worked.[129]

The most precious object derived from a marine creature was, according to Pliny, the pearl. He describes it as the most valuable item that could be possessed, though he later places it in second position behind the diamond. Pearls from Taprobane, Stoidis, and India were considered the largest, but those from the Red Sea and the Persian Gulf were the most prized, and the whiter they were, the higher the value achieved.[130] Other authors state that fine-quality pearls were available from the ports of Muziris and Bakare, as well as the Ganges region.[131] The pearl fisheries of the Red Sea were certainly being exploited by the late Augustan and Tiberian period, as two inscriptions set up by Publius Juventius Agathopous, a freedman of Publius Juventius Rufus (tribune of the *Legio III Cyrenaica* and *eparchos* of Berenike) indicate. Rufus was charged with their supervision, alongside his role of supervising the mines and quarries of the Eastern Desert.[132]

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125 *TPSulp* 101 = *TPN* 102; De Romanis (2012a): 162–163.

126 *Periplus* 3, 6, 7, 10, 13, 17, 30–31, 56, 61, 63; Casson (1989): 101.

127 De Romanis (2012b): 85–88.

128 Pliny *NH* 9.13.39, 16.84.233. The veneering of tortoiseshell may have been undertaken so that it resembled the even more expensive citrus wood—Evers (2016): 23.

129 Van Neer and Ervynck (1998): 365; Sidebotham and Zych (2010): 13.

130 Pliny *NH* 9.54–59.106–123; 12.41.84. The author of the *Periplus*, however, described pearls from the Persian Gulf as inferior to those from India—36.12.9–10.

131 *Periplus* 56, 63; Strabo 15.1.67.

132 *I. Pan.* 121 = *SEG* XX 670 (first year of Payni of year 40 of Caesar = 26th of May, 11 CE); *I. Ko. Ko.* 41 (reign of Tiberius)—see Schörle (2015): 47–49.

Pliny claims that poor people desired pearls and were accustomed to saying that they were like a lady's *lictor* (the ceremonial attendants who accompanied magistrates with *imperium*).[133] It seems unlikely that the highest quality Indian Ocean pearls were within the reach of the poorest members of Roman society, but they may have worn imitations or low-quality ones available from Britain.[134] Indeed, a few Egyptian papyri record the numerous ways that one could create something resembling a pearl from low-cost materials, including mica, wax, egg white, and mercury bound by tragacanth gum.[135] It seems that the supply chain for the acquisition of these pearls became more complex and sophisticated by the first and second centuries CE. This was to meet an ever-increasing demand that was not exclusively confined to the upper echelons of the elite.[136]

India was regarded as the source of most precious stones among the Greeks and Romans.[137] These highly valued gems included opal, amethyst, onyx, and sardonyx.[138] Pliny describes diamonds as most prized of the gemstones, stating that they were available in India and Arabia—presumably through transshipment in the latter case, since real diamonds do not occur in Arabia.[139] He also mentions that diamonds were of greater value than gold, and Solinus mentions that diamond points were used to engrave gemstones such as sapphires.[140] According to the author of the *Periplus*, both diamonds and sapphires were available at the ports of Muziris and Bakare.[141] A sapphire, albeit in a late Roman context, has been found at Berenike, and another, used in a piece of jewellery, at the satellite settlement Shenshef.[142] The import of these

133 Pliny *NH* 9.56.114.

134 On British pearls see Pliny *NH* 9.57.15–16; fresh-water pearls were less regarded—Clark (1986): 80.

135 Schörle (2015): 53 n. 59.

136 Schneider forthcoming.

137 Strabo 15.1.67; Pliny *NH* 37.76.200. For Indian texts discussing the importance of these gemstones see Kautilya *Arthashastra* 2.11.107–114; Nakkirar *PuRam* 56 lines 17–20—Francis (1991): 38.

138 Opal from India—Pliny *NH* 37.21.80–82; Amethyst, many places but finest variety from India—Pliny *NH* 37.40.121–124; Onyx from Arabia and India—Pliny *NH* 37.24.90–91, including Barygaza—*Periplus* 48–49, 51; Sardonyx from Arabia and India—Pliny *NH* 37.23.87.

139 Pliny *NH* 37.15.56; Clark (1986): 75–76; Börner (1962): 222–224.

140 Pliny *NH* 37.15.61, 57.207, 75.200; Solinus *Collectonea Rerum Memorabilium* 30.33; for the use of diamond shards for engraving see Gorelick and Gwinnet (1988): 550–551.

141 *Periplus* 56—*adamas* and *hyakhinthos*.

142 Sidebotham (2011a): 237.

stones was not, however, limited to the Late Antique period, as the mummy of a young woman found in a second century CE sarcophagus in Vallerano (a southern suburb of Rome) demonstrates. She was buried with a necklace of gold and Sri Lankan sapphires, a diamond, an ivory doll, and Chinese silk.[143]

The emerald or smaragdus (the latter a broad term for a group of precious gems) is said by Pliny to have been the third most precious object behind the diamond and pearl. Neither Pliny nor the author of the *Periplus* refer to emeralds coming directly from India. Beryl, however, which Pliny reports was considered by many to be similar if not the same as emerald, did come from India (emerald is in fact a variety of beryl).[144] It should be noted that beryls and emeralds were mined in the Mons Smaragdus region of the Eastern Desert of Egypt (see Chapter 7). Nevertheless, Schoff suggested that the transparent gems available at Muziris and Bakare were in fact beryls from the Coimbatore mines.[145] The thousands of Julio-Claudian *denarii* found in the vicinity of Coimbatore mines have also been seen by some as evidence for large scale demand by Roman merchants.[146] However, De Romanis has more plausibly argued that the large numbers of *denarii* found in the region probably reflect Indian demand and local trade networks.[147]

Excavations at the port of Arikamedu have revealed many semiprecious stones, such as jasper, crystal, carnelian, and banded agate, found both in rough form and in the form of beads, studs, and ring stones. These may have been intended as exports for both the Mediterranean and Southeast Asia.[148] Likewise, at the site of Pattanam (Muziris), there is evidence for significant agate and carnelian bead production. This is despite the fact that there are no known local sources for these stones in southern India, indicating that they were deliberately imported to be worked and then re-exported in (semi-)finished form.[149] Indeed, carnelian has been found at the port of Myos Hormos. At Berenike, finds include garnet beads, quartz crystals, milky and banded agate, onyx,

143 De Saxcé (2015b): 66–67. See also Teigen and Seland (2017b): v, who note that the young woman may have belonged to a Syrian diaspora in Rome.

144 Pliny *NH* 37.20.76–79; Sidebotham et al. (2004): 7, 13–14.

145 *Periplus* 56; Schoff (1912): 222–224.

146 Cimino (1994): 168–169; Rajan (1996): 103; Thapar (1997): 26; McLaughlin (2014): 175.

147 For Roman good found at sites connected to internal Indian routes see Selvakumar (2016): 293–306.

148 Raman (1991): 131–132; Francis (2004): 503–504. It is worth noting that from excavations from houses in Pompeii, possibly connected to gem-cutters, revealed carnelian, jasper and agate, among other stones—Evers (2016): 56.

149 The ratio of imported worked beads to local worked stones is 6:1—Kelly (2007–2008): 1–2.

and carnelian or sard. These stones originated from north-western, western or southern India.[150] The presence of cameo blanks at Arikamedu, Muziris, and Berenike suggests that it was a regular practice to import these semiprecious stones roughed out. They were destined for major workshops in Alexandria (or other urban centres), where they would then be worked into finished products.[151] In some cases, the stones may have been re-exported; Francis claims this was the case with Indo-Pacific beads meant for resale in East Africa.[152] It was not only semiprecious stones that were imported for use in jewellery, but other materials as well. Beads from a plant called Job's tears were imported to Berenike, most likely via India, to be used as jewellery (this is clear from the piercing).[153]

It should not be surprising that semiprecious stones were imported alongside more precious items like diamonds or pearls, nor that the former should appear more frequently in the archaeological record. There is no statistical evidence to indicate the comparative frequency with which these two groups of items were imported, but the lower cost of the semiprecious stones probably meant that they were acquired in greater numbers. Just like the elite, those lower down the social scale desired to express their sense of status and self-worth through the wearing of jewellery.[154] Pliny notes that social tastes adopted by the elite often filtered down the social scale: a desire to emulate (even with less-expensive materials) that is apparent from his comments about pearls. It is likely these semiprecious stones were part of this emulation.

Precious stones like diamond and beryl were mostly the preserve of the wealthier strata of society.[155] It is certain that only the wealthiest in the Roman Empire could ever spend, for example, 2,000,000 *sestertii* on an opal ring. Such items were the status symbol par excellence, used in competitive displays among the elite. While listing the most expensive products of his time, Pliny states that gold is scarcely tenth in place and silver almost twentieth, whereas Indian Ocean goods such as rock crystal and diamonds were seen as more valu-

150 Sidebotham (1986): 22; Francis (2000): 213, 221; Sidebotham and Zych (2010): 13; Zych et al. (2016): 325.

151 Sidebotham (2011a): 238.

152 Francis (2000): 213, 221, 224.

153 Cappers (2000): 160.

154 By way of parallel Pliny mentions a stone called xuthon which was much appreciated by those of lower status in India (*NH* 37.45.128).

155 See for example Heliodorus *Ethiopian Story* 2.30—Calasiris could afford to buy Indian plant products but had no hope of buying even one precious gem.

able.[156] It is in this vein that Pliny commented upon a well-to-do lady who, though not even from one of the wealthiest of families, chose to spend 150,000 *sestertii* (37,500 *denarii*) on a ladle made of rock crystal.[157] There is no doubting that precious stones were the most expensive imports of the Indian Ocean trade.

Indian Ocean Imports: An Overview

This survey has revealed an impressive array of imported Indian Ocean goods. Casson's notion that traders wasted no space in their holds on cheap mundane staples but were first and foremost dealers in luxuries does not hold up to scrutiny.[158] Indeed, as more archaeological and written evidence emerges, the picture of a peripheral trade in small quantities of high-value luxuries is increasingly being undermined. Cargo holds would not simply be filled with silks and precious gems, but also included foodstuffs, spices and aromatics, and bulkier items like metal and wood. The varying range and quality of different items becomes apparent when looking at textiles, where coarser clothing was acquired alongside more "middling" products like cotton and expensive items like silks and pelts. Semiprecious stones and beads, which had a wider market, were brought alongside the more expensive gems and pearls. The importation of this broad range of items reflected not only commercial considerations, but also, as will be discussed in Chapter 8, concerns over the seaworthiness of the ship carrying them.

The lack of surviving statistical data, more prevalent in later historical periods, has been repeatedly emphasised. The volume with which certain goods were imported can only be guessed at on the basis of impressionistic literary evidence and the frequency with which particular items appear in the archaeological record—an approach fraught with problems. It might be reasonably assumed that items like pepper and frankincense were imported on a much greater scale than slaves or exotic pets, given the greater number of allusions in the Greek and Roman sources. But such assumptions, however plausible, do not rest on solid statistical data.

Occasionally, the sources mention the prices for certain products imported via the Indian Ocean—most notable is Pliny's account of the costs of various aromatics and spices. This information is of great value in providing snapshots of how accessible some of these goods may have been in the Roman world—

156 Pliny *NH* 37.21.81–82 (opal ring), 37.77.204 (ratio of values of precious materials).

157 Pliny *NH* 37.10.29.

158 Casson (1989): 16.

that is to say, who might have been able to afford them, and what their potential prestige value may have been (in part linked to prices). Nevertheless, this data is limited in location and in time; Pliny's information can be tied to early Flavian Rome, while the figures in the Muziris Papyrus mostly likely reflect wholesale prices in Alexandria around the mid-second century CE. On its own, this data does not permit an understanding of the relative value of certain goods in different Mediterranean markets in a particular period. It is also of extremely limited value in trying to understand longer-term fluctuations in prices for certain imports. That said, Pliny does give the impression that imported plant products could fluctuate in value, not only due to quality and type but also due to vacillations in supply, as is to be expected from shortages and gluts in the market place.

Indian Ocean Goods and Roman Society

While statistical data relating to the volume in which specific goods were imported and the prices they fetched is rather poor, what could be termed "social data" is actually rather rich. Imports from India, East Africa, and southern Arabia are frequently alluded to in a broad range of literature, including histories, geographies, encyclopedic works, medical texts, the odd cookbook, and in various forms of poetry, such as satire. Many of the imported items were incorporated into an assortment of different socially significant activities. This led Sidebotham, in his 1986 work *Roman Economic Policy in the Erythra Thalassa 30 B.C.–A.D. 217*, to argue that many of these goods, especially spices and aromatics, were seen as particularly 'necessary by Roman aristocratic standards', if not also for those lower down the social scale.[159] He has subsequently emphasised the point that many of these spices and aromatics were comparatively inexpensive and consumed by a wide range of the Roman Empire's population: they were necessary for a great many people.[160] This is in sharp

159 Sidebotham (1986): 45, see also 176 where he states: 'Analysis of the types of goods traded in the commerce of the Erythraean Sea reveals that many wares imported by the empire were considered, by Roman aristocrats at least, as necessities, not luxuries. Well-to-do Romans used myrrh, frankincense, pepper, etc. for medicinal, religious and culinary purposes and their sale may have been subject to government control at least in the city of Rome.' For recent adoptions of the view that these goods should be seen as necessities see Morley (2007); Nappo (2007); Peacock and Williams (2007); Tomber (2008); and Sedov and Salles (2010): 453.

160 Sidebotham (2011a): 249–251. See also Sidebotham (2017a): 427.

contrast to the categorisation of the Indian Ocean trade as one of luxuries—a view which has been quite prevalent until recently.[161]

Sidebotham's view rests in part on the idea that because spices and aromatics were used in various medicinal, funerary, religious and culinary contexts they may have been seen as vital, whereas items like precious gems would have been regarded as luxuries. It is certainly beneficial to consider how these goods were used in various social contexts, and he is right in the view that Indian Ocean imports should not be dismissed as high-value items only consumed by the elite. However, there may be some benefit in further modifying this position. A strict dichotomy between luxury and necessity is problematic—no good is inherently imbued with a static quality. In fact, goods acquired meaning in the specific social contexts in which they are used; how they are interpreted is subjective, fluid, and multifaceted.[162] For example, many Romans seem to have felt that burning incense on a pyre was an appropriate means to honour the deceased, but this did not stop some writers, like Pliny, from complaining about its overly lavish use at funerals.[163] Indeed, for the elite these funerals had an important role in advertising the illustrious status of the family, as well as honouring the deceased.[164] The burning of incense in such a context could be regarded as helping to fulfil a moral obligation while also displaying the family's social status through appropriate lavishness and expense.

Sociological and anthropological scholarship of recent decades has emphasised the problem in attempting to apply the labels of luxury and necessity in a fixed or mutually exclusive way.[165] The potential overlap of the concepts of luxury and necessity is quite apparent in Roman society, considering that many of the Roman elites desired or felt compelled to advertise their status, prestige, and sense of social worth through lavish displays. These often seem to have included products derived from the Indian Ocean trade.[166] Polemics against the corrupting and feminising effects of *luxuria* do appear quite frequently in Roman literature, even if some acknowledged that living up to such lofty ideals was hard and that many who expressed such sentiments could be viewed as

161 See for example, Warmington (1928): 40–42; Casson (1989): 15, 19; Cappers (1999): 196; Dalby (2000a): 156; Wild (2004): 61–67; Keay (2009): 77, 90; Tchernia (2016): 48, 53.
162 Cobb (2013): 137.
163 Pliny *HN* 12.41.83.
164 Horace *Satires* 2.5.105–106.
165 Appadurai (1986a): 3–5, 16; Douglas and Isherwood (1978): 72–73; Kopytoff (1986): 76–80.
166 For extended discussion on this see Parker (2002); and Cobb (2013).

hypocrites.[167] At the same time, failing to live up to one's financial position and social status was frequently mocked and condemned in Roman literature.[168] The difficulties faced by the wealthy and elite of the Roman world who wished to appear sophisticated and tasteful rather than vulgar in their opulence is nicely encapsulated by Petronius, Nero's purported "arbiter of elegance", who created the comic character of Trimalchio (a wealthy upstart freedman from his novel the *Satyricon*).[169]

The problem inherent in viewing spices, aromatics, and indeed other Indian Ocean products as necessities or luxuries can be further demonstrated by considering a few examples of their uses in social contexts. A lavish banquet was a means of attracting guests and one element of this would be the exotically spiced dishes. Particularly ubiquitous was the use of pepper.[170] Other elements, like perfumes using Indian Ocean aromatics, expensive furniture made of materials like tortoiseshell and ebony, and bejewelled drinking cups might also mark the distinction of the host and the guests.[171] In the religious context, honouring the gods was for many an imperative, but this did not mean that members of the elite (or those lower down the social scale) could not engage in one-upmanship and a desire for novelty when making dedications. Pliny certainly felt it was worthy to note who the first individual was to offer up a cinnamon root or to dedicate cinnamon embossed in gold.[172] Incense and unguents might be used in funerary rituals, sometimes excessively in Pliny's view, but could also be used in perfumes, makeup, and even drinks.[173] Many Indian Ocean goods were obviously integrated into various aspects of Roman social practice, but it is abundantly clear that simple or fixed labels will not do. These goods only achieved a fluid and nebulous social meaning in the contexts in which they were used, and from the subjective and multifaceted perceptions of those observing their use.[174]

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167 Valerius Maximus 2.2.6, 9.1; Sen. *Ep.* 19.10; 82.2 (emasculation); 55.1; 92.10; 95.15, 19; 123.7 (weakening); Horace *Epodes* 8 lines 13–20 (hypocritical philosophers).

168 See for example, Martial *Ep.* 1.99, 1.103, 2.44.

169 Petronius *Satyricon* 15.26–78; Tac. *Ann.* 16.18; Pliny *NH* 37.7.20.

170 Martial *Ep.* 6.48; Sen. *Ep.* 19.11. In the *De Re Coquinaria* black pepper appears in almost every recipe; see also Pliny *NH* 12.14.29, who notes the popularity of black pepper.

171 Wallace-Hadrill (2008): 345; Cobb (2013): 139–140.

172 Pliny *NH* 12.42.19. See also Ovid *Fast.* 3.731–732.

173 Pliny *NH* 13.4–5.3. Theophrastus notes that sometimes perfumes could be added to wine because they had a sweet flavour (*On Odours* 51)—G. Reger (2005): 260. On the associations between frankincense dealers (*thurarii*) and perfumers (*unguentarii*) see Evers (2016): 62–67.

174 Cobb (2013): 152.

Economic Impact on the Roman Elite

Moralising discourse about the expenditure of wealth on Eastern goods appears throughout the early centuries of the Roman Empire: it was not confined to any particular genre, but appeared in poetry, history, natural history, satire, and other forms of literature. Women in particular came under censure, and descriptions of these very valuable objects are often, though not exclusively, associated with female use. The younger Seneca complained of the great expense of gold and silver mirrors adorned with jewels and bemoaned the spending of a patrimony on pearl earrings.[175] Juvenal comments, more explicitly, that men frequently were forced into indebtedness due to their wives' tastes for high-cost goods.[176] Olson correctly cautions that this rhetoric was frequently hyperbolic, but this does not mean that in many instances the concerns expressed were disingenuous.[177] Tacitus' description of the ruin of many ancient aristocratic families, who, in the twilight the Julio-Claudian period, exhausted their *patrimonia* on such Eastern goods, suggests that this rhetoric was born of reality (though perhaps with some exaggeration).[178] He also notes that those who had been close friends of Nero, despite having received millions of *sestertii* in gifts, had 'squandered' their wealth on 'extravagances' and had nothing left.[179]

Much of this moralising may be connected to the damage done by intensive social competition.[180] The concerns expressed by these authors are very much focused on the personal fortunes of their elite contemporaries, and should not automatically be assumed to express anxiety about the "economy" of the Roman Empire as a whole. The closest one might get to the latter is Tiberius' purported concern that the wealth of the Empire was being expended for the sake of women's finery.[181] But this admonishment was addressed to the Senate, many of whose members were expending great wealth on these Eastern goods. In light of the concern expressed in the sources about elite spending habits, Tiberius' statement, if not solely Tacitus' creation, might be interpreted as an expression of concern for the social stability of the elite rather than the wider Roman economy.[182]

175 Sen. *QNat.* 1.17.8–9, *Ben* 7.9.4.

176 Juvenal 6.509; see also 6.464–466—women buy everything that the Indians export, but this is done to impress their lovers rather than husbands.

177 Olson (2008): 86.

178 Tac. *Ann.* 3.55.

179 Tac. *Hist.* 1.20.

180 T. Morgan (2007): 310.

181 Tac. *Ann.* 3.53.

182 Notably see Tac. *Ann.* 2.48, where Tiberius removed members of the senate whose wealth had been dissipated through extravagance.

Indian Ocean Goods and the Wider Population

Many of the elites in the Roman Empire clearly used or consumed Indian Ocean goods in a whole range of ways. These elites also represented the small minority of the population who possessed the surplus income required to purchase them in sizeable quantities. Even then, some of the most precious gems and highest quality pearls were likely only affordable to those families whose wealth could be estimated in the millions of *sestertii*. Martial jokingly laments this fact, while Pliny cites the ostentation of the super-rich like Lollia Paulina, who wore emeralds and pearls worth 40,000,000 *sestertii* at her betrothal party—a fact she was keen to prove by showing receipts to anyone who asked.[183] Despite the mass concentration of wealth in the hands of a numerically very small group (or rather series of groups) within the Roman Empire, the "rest" should not be seen as economically homogenous. A whole range of individuals with varying levels of income existed, both in the city of Rome itself and across the Empire, from the destitute to those who possessed a moderate degree of surplus income.[184] This has led a number of scholars to argue that small quantities of some of the less expensive goods, particularly spices and aromatics, were purchased from time to time by those of more limited wealth. It is suggested that cumulatively these numerous small purchases by a wider segment of the population had a notable impact on the market for Indian Ocean goods.[185]

Young has pointed to legionaries as a segment in Roman society who could have made small purchases of some Indian Ocean imports. These soldiers earned 100 *sestertii* per month from the reign of Domitian up to that of the Severans.[186] Compared to Pliny's prices for a *libra* of frankincense or pepper, such a purchase would represent around 15 to 25 per cent of that (undeducted) monthly income (but only 1.33–1.75 per cent of their yearly income), leaving aside the problem that Pliny's figures may not be entirely reflective of prices in later periods. It has to be taken into account that a certain percentage of soldiers' pay was deducted for items like shoes and food. Indeed the net pay of these soldiers was 594 *sestertii* per annum in the period prior to 85 CE, and 784 *sestertii* from 85 CE up to the Severan period.[187] On this basis, 2.7 per cent of a

183 Martial *Ep*. 9.59, 10.80; Pliny *NH* 9.117.

184 On income levels see Allen (2009); Rathbone (2009).

185 Young (2001): 222–223; Sidebotham (2011a): 225; Van der Veen (2011): 70; McLaughlin (2014): 33–34; Evers (2016): 80–88; *contra* Raschke (1975): 67.

186 Young (2001): 222–223; see also Evers (2016): 85–86. For soldiers wages see Alston (1994): 114; Suet. *Dom*. 7.3; Cass. Dio 67.3.

187 For deduction on pay see Alston (1994): 113–123; and Rathbone (2009): 311.

legionary's (pre-85 CE) surplus income was required to buy one *libra* of black pepper per year. Of course, as Sidebotham has noted, individuals could purchase such items in much smaller quantities than a *libra* (323 grammes).[188] These types of small purchases of spices and aromatics can be seen from a shopping list found at Pompeii, which records the purchase of one *as* worth of incense (perhaps equal to almost five scruples (5.6 grammes) in weight, if the cost was similar to Pliny's three *denarii* per *libra*).[189]

Sidebotham has even gone so far as to suggest that all but the 'most destitute' could buy pepper, citing the Vindolanda tablets as evidence.[190] All but the most destitute may be an overstatement; however, groups like ordinary soldiers, who were by no means elite, often did possess the surplus income with which they could purchase such items. Indeed, their pay compares quite favourably to the 47 *sestertii* a month earned by skilled quarrymen, masons, and smiths at Mons Claudianus (about twice the pay of their contemporaries elsewhere in Egypt), which represents about half a soldier's wages at this time (mid-second century CE).[191] Although the Vindolanda tablets only have one reference to the purchase of pepper by a soldier, this purchase should probably be seen as indicative rather than exceptional.[192] Further complimentary evidence comes in the form of four ostraka (c. 77–125 CE) from the military station of Didymoi in the Eastern Desert of Egypt. These texts include requests for black pepper, such as a letter from Mokotralis to his brother Gemellus asking him to send pepper if he has any.[193]

Despite the caveats just noted, the basic premise that a wider segment of the population could make occasional small purchases is essentially sound. This is apparent from an analysis of the potential surplus income of the workers that can be ascertained from Diocletian's *Edict of Maximum Prices*, a short-lived attempt by the tetrarchs to fix wages as well as prices (301 CE). Allen, in an attempt to compare the potential purchasing power of an "average" Roman

188 Sidebotham (2011a): 225; see also Evers (2016): 85. McLaughlin (2010): 143, n. 17, compares the price of frankincense recorded in a Ptolemaic papyrus with that mentioned by Pliny. Equivalent to 40 and 32 *sestertii* per *mina* of weight respectively. Elsewhere McLaughlin ((2014): 25) suggests, without supporting evidence, that the grain dole in the city of Rome enabled its inhabitants to spend surplus income on Indian Ocean products.

189 McLaughlin (2010): 145 n. 41.

190 Sidebotham (2011a): 225.

191 Rathbone (2009): 312–313.

192 See Bowman and Thomas (1994): 135–141; *Tab. Vindol.* II.184.

193 *O. Did.* 327, 328, 364, 399—Bülow-Jacobsen (2012): 245–246, 286, 328–329. See also Broux (2017): 142–143.

day labourer with later historical periods in Europe, converted the values mentioned in the Edict into silver equivalents.[194] He noted that a low-skilled day labourer working 250 days a year (earning 25 *denarii communes* a day and a food subsidy equal to 11.1 *denarii communes*) could earn the equivalent of 289 grammes of silver (equal to 9,025 *denarii communes*).[195] With this he could reasonably maintain a family (wife and two children) at a cost of 262 g of silver, assuming he consumed little meat and did not purchase alcohol.[196] This theoretical labourer's expenditure, which Allen labels the 'barebones subsistence basket', includes the cost of rent, grain (which was perhaps eaten as boiled *puls*), and a small amount of vegetables, with very little expenditure on items like meat, olive oil, clothing, lamp oil, and fuel.[197] This left about 10 per cent of his expenditure, equivalent to 27 grammes of silver, left for non-essential purchases.

Theoretically, 27 grammes of silver is approximately 844 *denarii communes* (as valued at the time of Diocletian), which notionally meant that a whole *libra* of pepper could be purchased at the cost of 800 *denarii communes* as stipulated in the Edict.[198] This would imply consumption of almost one gramme of pepper per day (or just shy of ten grammes of pepper used in a meal once every two weeks). Of course, not many individuals are likely to have bought pepper by the *libra*, but instead would have made occasional small purchases of a scruple (1.12 grammes or 1/24 of an *uncia*) or an *uncia* (27 grammes, 1/12 of a *libra*). This would represent 0.3 to 8 per cent of this day labourer's surplus income. These estimations are not intended to prove that an average day labourer would have spent his surplus income on black pepper, only that it may have been possible to do so.[199] Other items, like wine or more varied food, could have been higher on the list of priorities.

194 Allen (2009): 329–331. These day-labourers included, farm hands, camel and mule drivers, water carries, and sewer cleaners—*Edict of Maximum Prices* 7.1a, 17, 19, 31, 32.

195 At this point (301 CE) one "common denarius" was reckoned at 0.032 g of pure silver. The term *denarii communes* is used here to avoid confusion with the earlier purer *denarii*.

196 By the late third century CE the silver content of the *denarius* had dramatically declined, essentially to the point of the coins being billon. Nevertheless the *denarii communes* continued to act as a unit of account, 1000 being the equivalent of a *solidus*, a high purity gold coin weighing about 4.5 g.

197 For these calculations see, Allen (2009): 335–342. For the importance of the baker in making bread see, Plautus *Asin.* 199; Pliny *NH* 18.27–8.105–108; Monteix (2015): 213–217. Scheidel (2010): 454, notes with regard to household income that many wives and children were also probably employed in some capacity to help sustain the family.

198 *Edict of Maximum Prices* 34.67.

199 The poor may have chosen to buy cheaper, inferior juniper berries (providing a similarly

Analysis of other groups from the *Edict of Maximum Prices* also highlights the feasibility of a wider segment of the population being able to purchase black pepper. For example, shipwrights could earn 60 *denarii communes* a day (the equivalent of 71.1, if the food subsidy is factored in) and terracotta figurine makers could receive 75 *denarii communes* (86.1). Second-rate scribes writing 500 lines a day could receive 100 *denarii communes*, and teachers of Greek and Latin literature (assuming they had 25 pupils) could earn the equivalent of 167 *denarii communes* a day. These individuals would have substantially more surplus income than the day labourer. But even if it is assumed that they consumed Allen's 'respectability basket'—which is more generous in terms of meat and wine rations, has bread made from milled wheat rather than *puls*, includes sufficient purchases of olive oil for food, cooking and lighting, as well as vegetables, cheese and eggs, fuel, and textiles for clothing—these groups still had sufficient surplus income (sustaining a family would on this would require 516.4 grammes of silver a year).[200] An *uncia* of black pepper would represent just over 5.5 per cent of the shipwright's surplus income, and only about 1.4 per cent of the terracotta figure worker's (assuming a working year of 250 days). The second-rate scribe could buy an *uncia* for a mere 0.8 per cent of his surplus income, or a *libra* for 9.7 per cent. The teacher would be able to buy a whole *libra* of black pepper with 3.3 per cent of his surplus income, or buy four *libra* a year at 13.2 per cent—enabling him, in the latter case, to consume on average about 25 grammes a week: more than enough black pepper for several fancy dishes at a feast.[201]

These hypothetical calculations do not prove how people in the Roman world spent their surplus income, but they do indicate that many moderately prosperous, but by no means rich, individuals could have bought black pepper or other similarly priced plant products, like frankincense. Even a day labourer

bitter, but less mature flavour)—Dalby (2006b): 195–196. Pliny *NH* 12.14.29, notes the sharp practice of vendors who adulterated their pepper with these berries.

200 Assuming a 250 day working year, and consumption of the Allen's respectability basket, this left 1221 *denarii communes* (or 39.1 g of silver) surplus for the shipwright, 4,884 (156.3 g) for the terracotta figurine worker, 8,278 (264.9 g) for the second-rate scribe, and almost 24,500 (784 g) for the teachers of literature.

201 What might be consider normal "usage" will have varied from context to context. The *De re coquinaria* makes no mention of specific quantities in most recipes, but a few examples including six scruples (6.72 g) in a vegetable and brain pudding (2.131), three scruples (3.36 g) in an asparagus and fig-pecker dish (2.132), six scruples (6.72 g) in an elderberry pie (2.135), six scruples (6.72 g) for a roast chicken dish (6.241), and eight scruples (8.96 g) for a game meat sauce. For more detail see Cobb forthcoming.

may have done so in rare circumstances. This characterisation seems to be broadly reflected in archaeobotanical studies. Notably, excavations in Central Europe show a strong connection of finds of black peppercorns with military sites and trading centres.[202] At both Myos Hormos and Berenike, black pepper finds were mostly concentrated in buildings connected with the trade or in the locations where commodities were transferred from shipping to caravans (and, in the case of Berenike, in religious contexts).[203] A few mineralised samples of black pepper have also been identified in connection to the House of Hercules' Wedding and the House of the Vestals at Pompeii.[204] Similarly, two mineralised black peppercorns were discovered in one of the sewers (Cardo V) at Herculaneum, associated with a well-to-do apartment (II.7).[205] So far there are few finds at rural (non-military) sites, although future archaeobotanical studies may change this picture.[206]

The literary sources can also provide a sense of the potential popularity of certain Indian Ocean products, like pepper. Pliny disapprovingly comments upon the popularity of this spice, while the cookbook of Apicius reveals that it was included in over 80 per cent of the 478 recipes recorded in this work, even in many sweet dishes.[207] That pepper was consumed by some lower down the social scale can be inferred from a few of Martial's satiric epigrams. In one epigram, Martial complains that the cooks will ask for wine and pepper for his workmen's lunch, to which he expresses (mock?) shock.[208] Does this imply

202 Oberaden (centurion's latrine)—Kučan (1984): 52–55; Mainz and Vindaussa (military site and trade centre) and Neuss-Novaesun (military fort)—Bakels and Jacomet (2003): 547–555. A single peppercorn has been identified at Biesheim-Kunheim, west of Freiburg, near the limes and adjacent garrisons—Jacomet and Schibler (2001): 65–66; Cappers (2006): 119. Twelve peppercorns have been found at Hessen in a *vicus* well (adjacent to a military fort)—Kreuz (1995): 70. In the harbour area of Straubing 52 peppercorns have been found—Küster (1995): 137.

203 Cappers (2006): 114; Van der Veen and Morales (2015): 59–61.

204 Ciaraldi (2007): 114–115, 125, 139–140, 145, 157.

205 Robinson and Rowan (2015): 114.

206 It is possible that four *piperatoria* or pepper pots (not mills) found at Hoxne, Suffolk (early fifth century CE), may be indicative of elites living in countryside villas who consumed pepper—Van der Veen and Morales (2015): 60. See also similar finds in Bulgaria (Nocolaevo, Late Antique), France (Vienne and Chaourse, third century hoards), and possibly at Sidon (Lebanon)—Van der Veen 2011: 45; Evers (2016): 88–89.

207 Pliny *NH* 12.14.29; *De Re Coquinaria*—81% of recipes include black pepper, 3% ginger, 1% rice—Van der Veen and Morales (2015): 60; Solomon (1995): 116–117.

208 Martial *Ep.* 13.13.

familiarity and a common taste for pepper among workmen, or is it merely a joke about the cook's extravagance? In another epigram, Martial mocks the puffed-up pride of the legal advocate Sabellus, who considers himself fortunate for receiving from his clients (on the *Saturnalia*) three and a half *libra* of black pepper and frankincense.[209] Should black pepper and frankincense be seen as trifling and not particularly lavish gifts?

The sense in which these Indian Ocean plant products might be seen as lavish or common may come down to the quantity in which they were used. Martial complains that the amount of pepper his cook wanted to use to flavour a boar would bankrupt him.[210] Yet the satirist Persius mocks the miserly man who reserves pepper for his birthday, and then only sprinkles on a little.[211] In one case the excessive use of pepper comes across as overly lavish, in the other its limited use is seen as parsimonious. It would probably be a mistake to try and force too rigid a sense of consistency on the polemical or satirical references to Indian Ocean products in the literary sources. However, it can be said, with some confidence, that items like pepper and incense had become firmly embedded in the social life and consciousness of many Romans—at least for those living in large urban centres—whether they regularly purchased it or not.

Summary

The goods imported via the Indian Ocean were extremely diverse, and a great many of them were incorporated into various aspects of social life in the Roman world, particularly for the elite. The manner in which they were used and consumed was multifaceted, and open to a variety of subjective interpretations. But the one thing standing out in the intense social competition among the elite, where there was a desire to advertise and display one's status, was the frequent employment of Indian Ocean goods. The desire or need to spend lavishly seems to have impacted on the personal fortunes of some members of the elite. For the rest of society, analysis of data from the *Edict of Maximum Prices* suggests that non-wealthy but moderately prosperous individuals could have made purchases of less-costly plant products, like black pepper and incense, should they have desired it. The literary evidence, impressionistic as it is, also

209 Martial *Ep.* 4.46.
210 Martial *Ep.* 7.27.
211 Persius 6.18–21.

suggests the popularity of items like black pepper, even by those quite far down the social scale. They became truly lavish only when used in substantial quantities.

CHAPTER 7

Exports

The study of Mediterranean exports is beset by the same problems discussed in the last chapter—namely, a woeful lack of statistical data coupled with a reliance upon impressionistic written evidence and conclusions that can be drawn from material remains. However, these problems are even more acute since, unlike the Greek and Latin sources, which provide vivid details about the social significance of Indian Ocean imports, comments in Indian literature, like the Sangam corpus, tend to be more sporadic. Indigenous literary testimony for the Arabian Peninsula and East Africa is non-existent (some information can be gleaned from inscriptional evidence in Arabia), and external accounts, like the *Periplus*, are relied upon to give indications of the goods desired in these regions. In consequence, interpretations drawn from archaeological excavations take on an even greater significance.

The uneven nature of excavations across different regions presents further challenges. The East African littoral (excluding the Red Sea ports of Egypt) has not been subject to the same intensity of archaeological investigation as the southern Arabian Peninsula or India, though recent work at Adulis and on the island of Socotra are welcome additions.[1] Earlier excavations at the sites of Qana' and Khor Rori, in Yemen and Oman respectively, have provided useful information, although recent troubles in Yemen may preclude work in this area for the immediate future. An increasing amount of Early Historic sites in India have revealed material originating from the Mediterranean world. However, the volume of the material that was recovered from Arikamedu and that which is currently being unearthed at Pattanam by far outstrips other sites.

Despite the limits of the evidence, a number of scholars have repeated two broad generalisations about trade between the Roman Empire and India. The first asserts that Indian societies were unwilling to accept Roman craft goods and instead insisted on receiving gold and silver, especially in southern India.[2] The second and interconnected assertion is that Western merchants would not waste space on mundane staples and that bulk commodities, when brought

1 Peacock and Blue (2007b); Strauch (2012); Zazzaro et al. (2015).

2 See for example Warmington (1928): 271–318; Casson (1989): 30–31; P. Gupta (1991): 125; Miller (1969): 216–222; Young (2001): 203–204.

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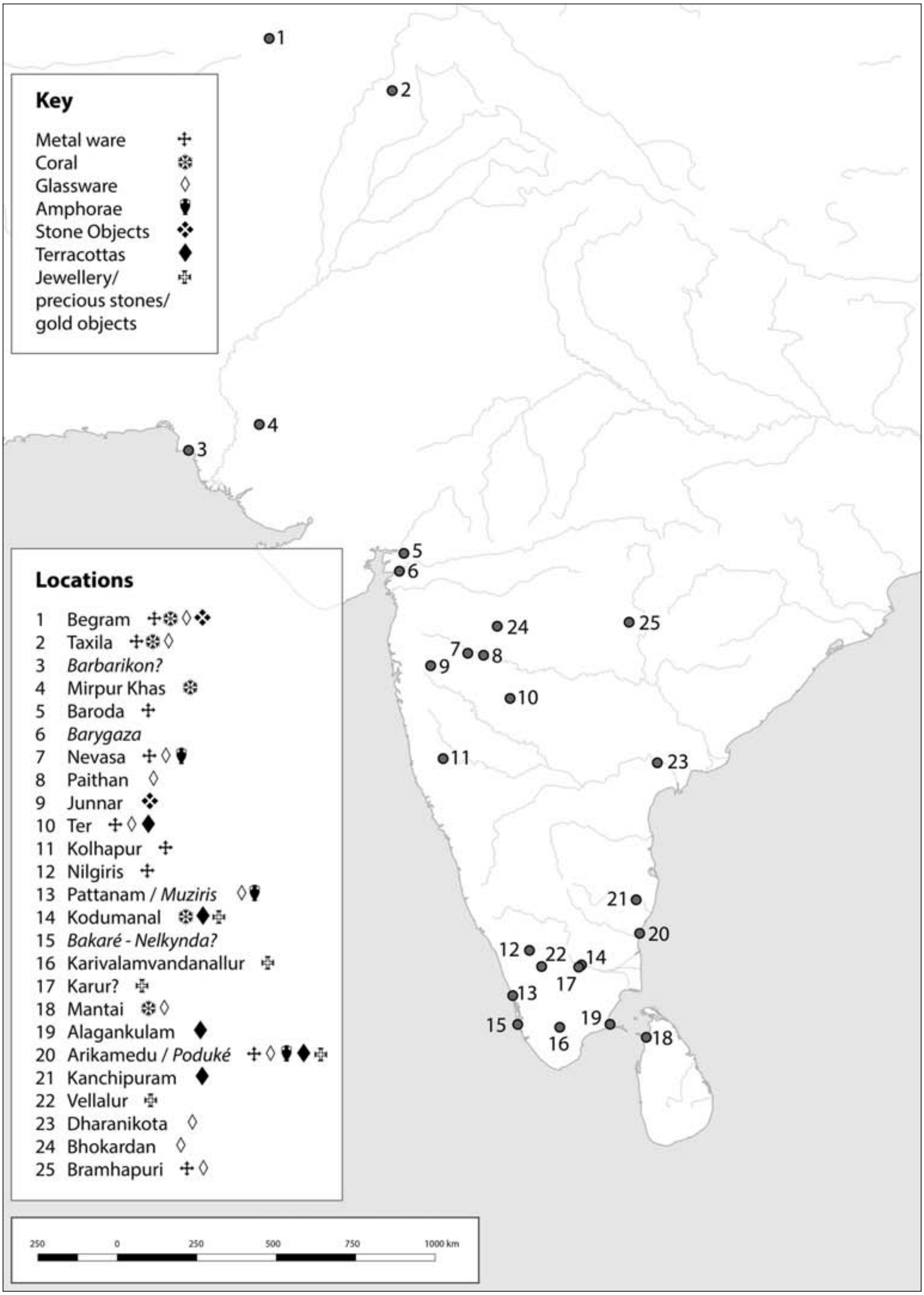


MAP 6 *The distribution of Roman finds in India*

along, merely acted as space-fillers.[3] It will be demonstrated in the next few chapters that these two notions need serious modification. The Roman Empire produced a wide variety of goods that were in demand, and merchants did not have to rely primarily on gold and silver as a means of exchange. Furthermore, the need for ballast and the correct stowage of goods meant that a diverse range of cargo was an advantage in keeping a ship seaworthy during voyages on the open sea.[4]

Exports from the Mediterranean World

The following discussion of exports focuses on the different categories of goods, rather than offering a purely geographic focus. This is in order to highlight the variety of goods exported and show what can be gleaned about trading patterns from the available evidence.

Foodstuffs and Olive Oil

Recent scholarship on long-distance trade in the Mediterranean has increasingly recognised that the goods traded were not merely "luxuries" for elite consumption, but included a whole range of different products.[5] The previous chapter has shown that foodstuffs from Africa and India did make their way to the Red Sea ports. The reverse situation is also the case. It is important not to simply dismiss such finds as only indicating crew provisions. Certainly, the author of the *Periplus* alludes to the use of grain (σῖτος) in limited amounts for the purposes of barter and exchange in East African and southern Arabian ports, and sometimes as a means of gaining the goodwill of local rulers.[6] At Muziris and Bakare, there was said to be demand for grain in sufficient amounts for those 'involved in shipping because the [local] merchants do not use it'.[7] The Nikanor archive indicates that grain was frequently transported to Red Sea ports from the Nile, and, given the testimony of the *Periplus*, it seems some grain was intended for export.[8]

3 Warmington (1928): 265, 315; Casson (1984b): 42–47; Casson (1989): 16–18; Whitewright (2008): 52; Smith (2009): 90.

4 See Map 6. Note that Map 6 focuses on goods other than coins and amphorae. The latter have been included in some instances when they appear alongside other items.

5 Morley (2007): 39–43; Whitewright (2008): 51–52; Wilson (2009): 214.

6 *Periplus* 7 (Avalites—limited amount), 17 (Rhapta—large quantities but as gifts to gain goodwill), 24 (Muza—limited amounts), 28 (Kane—limited amounts).

7 *Periplus* 56—trans. from Casson (1989).

8 *O. Petr.* 220, 223, 228, 229, 233, 241, 248, 253, 256, 260, 262, 266, 269, 271, 277, 278, 279, 283, 294

It is not clear if processed or preserved fruits were being exported, since fragments of one vessel type (Dressel 22), often used in the Mediterranean as a container for fruit, have been found at Arikamedu. However, the possible remnants of fish sauce have been identified in the vessel lining, suggesting that it had been reused for this purpose prior to arrival at the port.[9] As a rule, pickling or drying fruits would be the best method of preservation on voyages of many weeks. It is almost certain that fresh fruits would not have reached India from the Roman Empire.[10] The excavators at Berenike have discovered thousands of specimens of olive remains, hundreds of grape remains, and some fruits like watermelon and apricot.[11] There may even have been a building at Myos Hormos that was situated in a waterlogged area for the purpose of keeping products cool. This was the most efficient way of slowing down processes of decay without changing taste and colour.[12] Clearly, fresh foodstuffs could be brought to the Red Sea ports for local consumption, but it might be doubted that such products were frequently intended for export. Nevertheless, the *Periplus* records that the port of Avalites imported unripe olives (useful as a salt supplement) deriving from Diospolis (Thebes).[13]

One food item that was preserved and shipped for export was garum (a fermented fish sauce), as seen from the nine fragments of Spanish amphorae identified at Arikamedu.[14] As noted in Chapter 5, the existence of a Roman merchant community at Arikamedu is open to debate, and it is entirely possible that this product was consumed as a delicacy by the local population of the area. It is certainly clear that varieties of garum could fetch significant prices in the Roman Empire. Pliny reports that some of the highest-quality sauces sold for 1000 *sestertii* (250 *denarii*) for a few *congii* (a *congius* was about 3.2 litres).[15] There are no means of ascertaining the prices garum might have fetched in India.

Olive oil was more than simply a condiment in the Mediterranean world: it was also used in bathing and as fuel for lamps. As with garum, it is often as-

(Myos Hormos); 221, 224, 230, 231, 250, 251 (Berenike); 232 (130 *artabas*, but the port is not specified); 249, 298, 303 (port name not surviving/recorded).

9 Will (1996): 319; Will (2004a): 328; Suresh (1992): 47; Suresh (2004): 105.

10 Morley (2007): 24.

11 Cappers (2000): 306; Cappers (2006): 63.

12 Peacock et al. (2006b): 70; Cappers (2006): 146.

13 *Periplus* 7; Casson (1989): 112; Cappers (2006): 103 (salt supplement).

14 Will (1996): 319; Suresh (2004): 105.

15 Pliny *NH* 31.43.95.

sumed that it represents supplies for resident Roman merchants.[16] This view is sometimes supported with reference to the *Periplus* as it mentions a small amount of olive oil being in demand at Barbaria (in the territory of King Zoskales). Since the port is said to have foreign residents who desired Roman money, it is assumed this oil must have been consumed by Romans.[17] It is not impossible that the philhellenic king Zoskales and his court had developed an appreciation for olive oil, although this is speculation. As noted in Chapter 5, the presence of specimens of Spanish (Dressel 20) and Istrian (Dressel 6) olive oil jars has been connected to resident Romans, but again, such assumptions are controversial.[18] Whether ultimately intended for resident Roman merchants or local populations, a very modest demand for olive oil (and garum) existed.

The Nikanor and Berenike ostraka certainly allude to the transport of olive oil to Myos Hormos and Berenike, no doubt reflecting a mixture of local consumption, ship supplies, and exports. The frequency with which it is mentioned, however, indicates that it was not transported on nearly the same scale as wine. The Nikanor archive contains only one ostrakon that mentions olive oil, compared to the fifteen mentioning wine.[19] The Berenike archive contains six ostraka permitting the movement of olive oil through customs, compared to over 80 ostraka for wine.[20] This evidence further emphasises the point that olive oil, if it did find a local market, was only desired in comparatively limited amounts.

Wine

This product was undoubtedly a major export, at least during the first century CE, as indicated by literary testimony and archaeological evidence for its distribution across various sites. The Greek and Roman sources make reference to the popularity of wine among the Indians. Curtius Rufus states that wine was widely consumed among all the Indian peoples, while Lucian imagined that Indians went crazy for wine upon first drinking it, getting twice as drunk as other people due to their hot-blooded nature.[21] Such perceptions about Indian susceptibility to drink had even permeated popular culture, as shown in the play *Charition*, where it acts as an integral plot device.[22] These assumptions,

16 See Chapter 5.
17 *Periplus* 6; Casson (1989): 112; Seland (2010): 37.
18 Begley (1993): 102; Suresh (2004): 105; Will (1991): 153–154; Will (1996): 318–319.
19 *O. Petr.* 295 (port name not surviving).
20 *O. Ber.* 4, 26, 28, 43, 87, 94 (ostraka mentioning olive oil).
21 Curtius Rufus 8.9.30 (*contra* Strabo 15.1.53); Lucian *Nigrinus* 5; Dalby (2000b): 192–193.
22 *POxy.* 413; E. Hall (2010).

of course, represent Graeco-Roman conceptions about Indians, not unadulterated reality. Nevertheless, Indian literature does reveal an appreciation for wine, including one Indian Sangam poem which speaks of the sweet and cool wines brought by splendid Yavana ships.[23] It is quite likely that imported Roman wines were appreciated both as a delicacy as well as an expression of status.

The *Periplus* reveals the demand for wine that existed in several East African, southern Arabian and Indian ports.[24] Italian and Laodikean wines were highly sought after in Barbaria and Barygaza (the king of the latter region being partial to fine wine), suggesting some kind of selectivity; particular types or qualities are not specified elsewhere.[25] The appreciation of specific wines in these regions was perhaps due to long periods of contact with "Greeks" and some level of acculturation (in the case of Central Asia and Pakistan, the legacy of the Graeco-Bactrians and Indo-Greeks may have been of some significance).[26] In Barbaria, King Zoskales was said to have been well versed in reading and writing Greek.[27] The site of Tillya Tepe (Afghanistan) reveals the continued appreciation and adaptation of aspects of Hellenic culture in Bactrian society. This site has revealed over 21,000 objects, mostly gold, from the first century CE, many showing strong Hellenic influences, including signet rings of Athena, clasps of Cupid riding a dolphin, a Hellenic ephebe (adolescent male) surrounded by Chinese-style dragon-lions, and a gold box recording its weight in Greek.[28] Hellenic influences are present at Gandhara (northwest Pakistan and eastern Afghanistan), which was connected to the flow of goods through the port of Barygaza.[29] The population had maintained a

23 *Purananuru* 56.18–21. The *Arthasastra* (2.25.24) indicates that parts of India also produced wine, the northwest being singled out for its quality.

24 *Periplus* 6, 7, 17, 24, 28, 39, 49, 59.

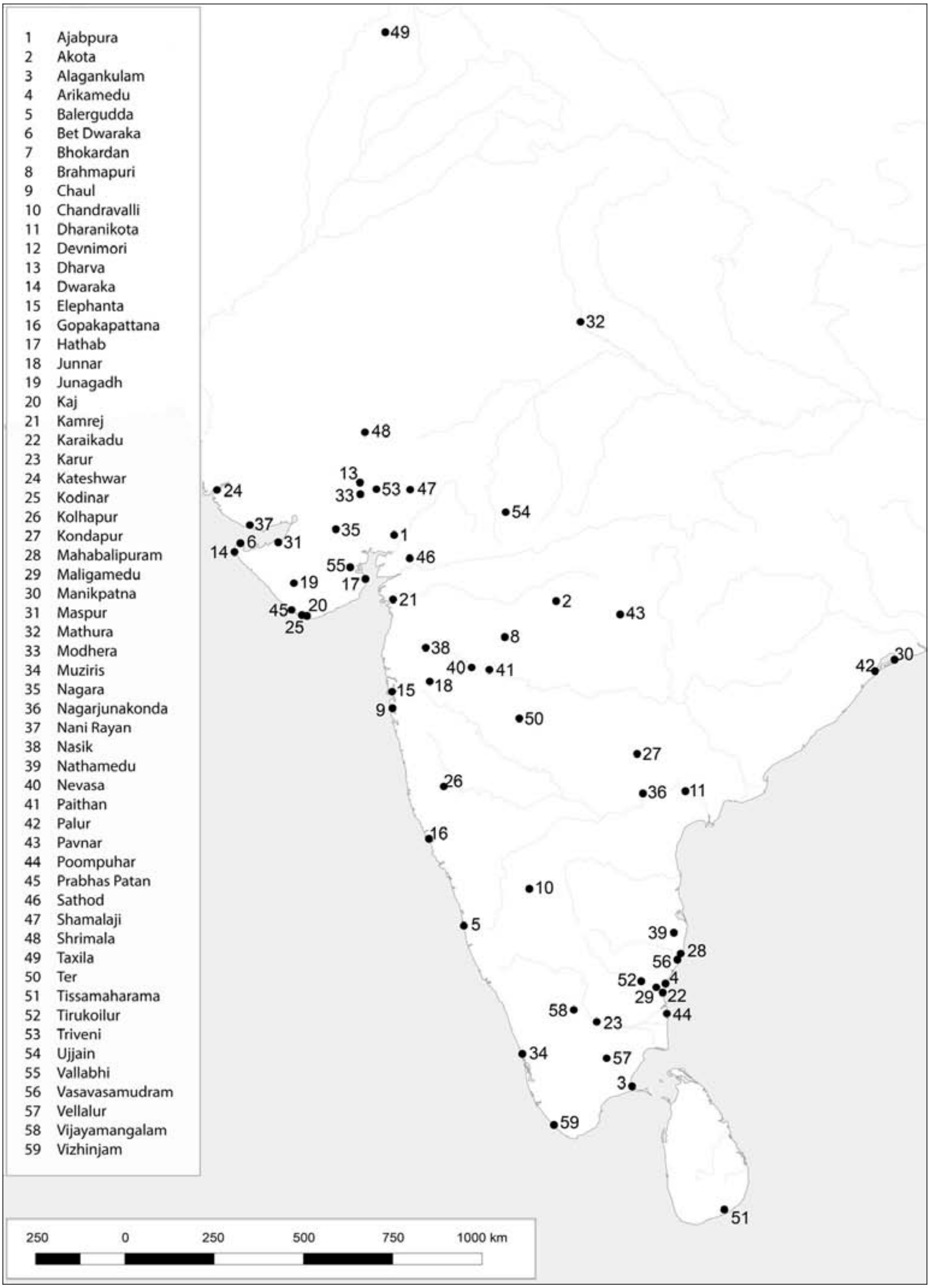
25 This includes at the ports of Avalites, Rhapta, Muza, Kane, Barbarikon, Muziris and Bakare.

26 On the debate over whether the demand for specific types of wine represents a response to the choices of Indian "consumers" or merely what Roman merchants decided to export see Rathbone (1983): 87; Suresh (2004): 108; Gurukkal (2016): 136.

27 *Periplus* 6.

28 Massoudi (2011): 40; Hiebert (2011): 63; Sarianidi (1985): 230–255; Sarianidi (2011): 214–217; Schiltz (2011): 219–293. See also the material, artistic and architectural legacy at Aï Khanum—Francfort et al. (2014), esp. 76–81 (for material culture).

29 For the debate over the extent of Graeco-Bactrian/Indo-Greek, Roman, Chinese and Iranian influences in Gandhara and Bactria see Boardman (1992): 36–38; Ball (2000): 141–148; Keay (2000): 103, 111; Parker (2008): 110–111; Tomber (2008): 123; Fröhlich (2009a): 60–72; Mairs (2009): 137–143; Cambon (2011): 155–159; Schiltz (2011): 229; P. Bernard (2011): 104–105, 126.



MAP 7 *The distribution of Roman amphorae sherds in India*

taste for wine and followed the accompanying rituals, as is indicated by the use of craters (mixing vessels), the presence of imported wine vessels, and the connection of Dionysos to some aspects of Buddhist rituals.[30] In addition, as already discussed in Chapter 2, the transition from Coan to Italian wine at Arikamedu may reflect the ability and need of merchants to adapt to locally developing tastes.

The ostraka from the Nikanor archive and the Berenike customs passes reveal an overlap with the wine types mentioned in the *Periplus* and those being delivered to the Red Sea ports. The Nikanor archive refers in particular to Aminaean and Laodikean wines being sent to Myos Hormos and Berenike.[31] Laodikea, in Syria, had a long tradition of exporting wine to Alexandria, though this has been determined mainly from literary sources, rather than ceramic evidence.[32] Other varieties mentioned in the archive include Onisian wine.[33] Like the Nikanor archive, the Berenike customs passes predominantly refer to Italian (47 separate times) and Laodikean (26 separate times) wines.[34] These receipts also record Rhodian, Aminaean, Ephesian, Kolophonian, and even local (Egyptian) wine in Laodikean vessels.[35]

The archaeological evidence from Myos Hormos and Berenike parallel these patterns to some extent. Both sites reveal the predominance of Italian Dressel 2–4 among the imported amphorae, alongside Rhodian and Istrian amphorae

30 Brancaccio and Liu (2009): 224–225, 228, 232—the Dionysiatic rituals appear on Buddhist friezes; see also other Buddhist sites such as Sanghol and Mathura—H. Ray (1995b): 103.

31 *O. Petr.* 241(?), 290 (Laodikean), 290(?) (Aminaean)—to Myos Hormos; 224, 240 (Aminaean)—to Berenike.

32 Strabo 16.752; Bagnall, Helms and Verhoogt (1999): 202; Fraser (1972): 165–167 (tradition of Laodikean wine going to Alexandria). Aminaean grapes are particularly associated with central Italy and it is generally though that reference to it refers to wine imported from this region, though it could refer to type a type of container—see Rathbone (1983): 81–98; Wendrich et al. (2003): 76–78; Tomber (2009): 46; Sidebotham (2011a): 233.

33 For Onisian wine see *O. Petr.* 247. The term 'Ptolimaika' or 'Ptolemaikos' also appears in the Nikanor archive: *O. Petr.* 283 (Myos Hormos), 238, 242, 268, 287 (Berenike), 235 (unspecified destination). The usage of this term could indicate Egyptian wine, but it might be a term of measurement—Sidebotham (2011a): 233–234. See also *O. Ber.* 146, 187—Bagnall, Helms and Verhoogt (2005): 8, 59.

34 Italian: *O. Ber.* 1–2, 5–7, 9–11, 13–16, 18–19, 21, 24, 26, 28–30, 34–35, 38–40, 47, 50–51, 53, 55–57, 59–61, 66, 74, 84, 90, 104, 149; Laodikean: *O. Ber.* 8, 17, 20, 39, 41–42, 46, 49, 64, 70, 73, 76, 78–79, 81–83, 87, 92, 94, 116, 145, 147–148, 153, 156.

35 *O. Ber.* 21 (Kolophonian); 87 (Ephesian); 91 (Aminaean); 20, 36, 48, 87 (Rhodian); 88 (local (Egyptian))—Bagnall, Helms and Verhoogt (2000b): 18. Some wines lack a surviving specification, see for example *O. Ber.* 488—Ast and Bagnall (2016): 182.

(Myos Hormos), and a few amphorae fragments of Syrian origin (Berenike).[36] Some Dressel 2–4 amphorae in Laodikean fabrics have also been found at both ports. The predominance of Italian Dressel 2–4 amphorae is further apparent from the Roman shipwreck at Fury Shoal (Sha'ab Sataya), just north of Berenike.[37] Additionally, maritime surveys of the seabed near Qana' have also confirmed the importance of Italian (mostly Campanian) and Laodikean wine to judge from the assemblage of amphorae fragments retrieved.[38]

The number of sites across the Indian subcontinent that have revealed Roman amphorae sherds may be as high as 50 or more, although some previous identifications have been challenged by Tomber, who argues that they need to be reclassified as Mesopotamian.[39] Finds are not only restricted to the mainland but include island sites like Elephanta (near Mumbai), which has revealed mostly Late Antique Roman vessels (although some are Dressel 2–4).[40] Sri Lanka has also revealed finds at sites like Tissamaharama.[41] At many sites in South Asia the pottery fragments have not been dated to type, the most notable exceptions being those found at Arikamedu, Nevasa, and Pattanam (Muziris).[42] However, where the stratigraphy has been examined, most of these Roman amphorae sherds were found in first century CE layers.[43] At Mathura, a sherd bearing the stamp 'M. CAVSTR SVR' (Dressel 3) has been discovered, which Will notes may be connected to the M. Cantrius Marcellus who was a *duovir* and benefactor at Pompeii.[44] The site of Nevesa has yielded 63 amphorae sherds, but most sites have produced only a few each.[45] Examination of the surviving sherds reveals that many were of the "black sand" fabric

36 Blue and Peacock (2006b): 73 (Myos Hormos); Tomber with contributions by Harrison-Hall (1999): 125; Bagnall, Helms, and Verhoogt (2000b): 19; Cappers (2006): 104 (Berenike).

37 Tomber (2005): 228–229; Sidebotham (2008): 310.

38 Davidde (2017): 591–593.

39 Suresh (2004): 182–183, records 41 sites across Tamil Nadu, Andhra Pradesh, Orissa, Karnataka, Gujarat, Maharashtra, Madhya Pradesh, Uttar Pradesh, and Pakistan; H. Ray (2010): 10, and Krishnan and Balvally (2015): 236–237, note about 55 sites in India which reveal Roman amphorae. See also Sidebotham (2011a), 233 n. 119. On the reclassification of some amphorae see Tomber (2007a): 972; Tomber (2009): 43–44, 50–51. See Map 7.

40 Shinde, Gupta and Rajgor (2002): 76–77, 79–81; Gaur, Sundaresh and Tripati (2006): 126.

41 Muthucumarana et al. (2014): 42; Schenk and Weisshaar (2016): 466, 468.

42 Suresh (2004): 99–100; Tomber (2007a): 972–973, 979; Tomber (2009): 43;—for Muziris see Sidebotham (2011a): 191; Cherian et al. (2009); Shajan et al. (2004); Selvakumar, Shajan, and Tomber (2009).

43 Agarwala (1985): 5; Slane (1991): 212; Thapar (1997): 13; see Suresh (2004): 99, 182–183.

44 CIL 10.857d; Will (1991): 153 n. 11; see also Suresh (2004): 105.

45 Suresh (2004): 182–183.

typical of Campania; others were more broadly Italian, and a few appear to be Rhodian. The local material culture, including Satavahanan coins, dates the layers at Nevasa between 25 BCE and the second century CE.[46] However, it is most likely that the black sand amphorae date before 79 CE, since the eruption of Vesuvius heavily damaged the wine industry, which went into sharp decline after this catastrophe.[47]

A few dozen sites in Gujarat (northwest India) and around ten in Maharashtra (west India) have revealed amphorae fragments.[48] On this basis, Tchernia has argued that Roman merchants were more able to exchange goods in kind in these regions, while in southern India they were reliant on gold and silver.[49] Alternatively, Suresh has suggested that the comparative paucity of sites with amphorae finds in southern India is due to the reuse of these vessels for transporting spices back to the Mediterranean.[50] Amphorae were sometimes reused as packing containers in the Roman Empire.[51] However, there is not yet any evidence to substantiate their reuse for carrying spices. A few thousand black peppercorns have been found in a jar by the Great Temple in Berenike, but this has been identified as an Indian vessel.[52] Instead, it may be the case, as F. Wild suggests, that cotton sacks were regularly used to hold pepper—something alluded to in a few of the Tamil poems.[53]

Concerning the theory proposed by Tchernia, it should be noted that Tamil Nadu has nine sites with amphorae finds, including the hundreds of fragments from Arikamedu. The excavations at Pattanam (Muziris) in Kerala have also brought to light thousands of amphorae sherds, greatly outnumbering most finds in India.[54] These different patterns in northwest and southern India need not reflect a greater use of barter in the north and gold and silver payments in the south; instead, they could reflect the level of archaeological work under-

46 Gupta, Williams, and Peacock (2001): 11–14.

47 See Williams (2004): 441–450; and Williams and Peacock (2005): 140–148.

48 H. Ray (2010): 10; Suresh (2004): 100–101.

49 Tchernia (1997a): 23–39; Suresh (1992): 46; Cimino (1994): 182. Falk (2015): 108, points to cheaper sources for precious metals in the north.

50 Suresh (2004): 106.

51 Peňa (2007): 61–118.

52 Cappers (2006): 114; Sidebotham (2011a): 60; Sidebotham (2014): 615.

53 F. Wild (2004): 66—*Purananuru* 343.1–10. See also *Pattinappalai* 186, for a reference to bags of pepper being carried by a donkey to the port of Kaveripoompattinam.

54 For general ceramic finds in India see Suresh (2004): 182–183; Sidebotham (2011a): 191. For ceramic finds at Arikamedu see Will (2004a): 326–328; Will (2004b): 434–436; Williams (2004): 448; Wheeler, Ghosh, and Deva (1946). For ceramic finds at Muziris see Cherian et al. (2009); Tomber (2015); Tomber (2017): 543.

taken in different regions. It may also be the case that these patterns reflect the local distribution of these goods. Since the northwest Indian subcontinent had been exposed to a much greater degree of Greek influences during the Hellenistic period, it could explain the apparently more widespread demand for wine, while, as Suresh suggests, demand in the south may have been limited to urban elites.[55]

Textiles and Clothing

Just as the Roman Empire imported many types of textiles via the Indian Ocean, it also exported a wide range of them. As seen in the last chapter, imports were primarily produced in or re-exported from India and included cotton, silks, and Seric furs or skins. In contrast, the *Periplus* reports a wide variety of textiles that were shipped to East Africa, southern Arabia, and, to some extent, India. Unfortunately, the author of the *Periplus* is not always clear on the types of materials. He mentions that wraps from Arsinoe, printed fabrics, linens, double-fringed items, *abollai*, *kaunakai*, *monachê*, *sagmatogênê*, cotton cloth, *sagoi*, *stolai*, tunics, and *dieresis* were in demand at Barbaria, Avalites, and Malao in East Africa; meanwhile, *abollai*, blankets, girdles, Arab sleeve tunics, and purple cloth of fine and ordinary quality were exported to Muza, and unspecified clothing to Kane in Arabia. Unspecified clothing of all kinds with no adornment, along with printed fabric, girdles, and *polymita* (multi-coloured textiles), were exported to the Barbarikon, Barygaza, Muziris, and Bakare in the subcontinent.[56]

Casson speculates that the wraps from Arsinoe (in the Fayum) were linen, since the town was known to have a linen-weaving industry; he also presumes that the *kaunakai* were of wool, though earlier types were made of sheepskin fur.[57] The papyrus *P.CtYBR inv. 624* mentions that the author of the letter had previously written to ensure that blankets from ‘Oxyrhyncha’ (Oxyrhynchos) had been prepared for him, but complained that they had not. The material the blankets were made of is not specified.[58] Nevertheless, this seems to confirm the Fayum as a centre for textile production, with some of the products being exported.

One notable Roman export mentioned in the *Periplus* is *sagmatogênê*, an Indian cloth which seems to be made of cotton fabric.[59] A reference to cotton

55 Suresh (2004): 107.
56 *Periplus* 6, 7, 8, 24, 28, 39, 49, 56.
57 Casson (1989): 111, 113.
58 *P.CtYBR inv. 624*—Peppard (2009).
59 Casson (1989): 114, 292–293.

clothing raises the possibility that it was either being re-exported by Roman merchants or woven in Egypt for export to East Africa. The practice of re-working imported textiles is attested in relation to silk in both Graeco-Roman and Chinese sources. In particular, the *Weilüe* mentions how the people of Da Qin made a profit by taking plain Chinese silks and making them into patterned fabrics—it is possible that this refers to the Romans, although alternatively it may allude to peoples from Central Asia.[60] The comments by Lucan and Pliny at least allow for the possibility that this practice was undertaken by textile workers in the Roman Empire. Indeed, the *Edict of Maximum Prices* (301 CE) demonstrates the potential variety of (re-)worked silks that were produced, including dyed and embroidered silks.[61]

The remains of textiles do not usually survive in the archaeological record. Thankfully, however, conditions at Berenike have preserved some examples which may attest to the types of exports, although some of this material has been identified as disused sails. Nevertheless, the fact that cotton woven using Egyptian methods has been unearthed at Berenike strengthens the possibility that cotton garments woven in the Roman Empire were exported.[62] In general cotton features prominently among the remains at Berenike, followed by wool, then linen. The woollen fabrics of the Julio-Claudian period were often of fine quality, no doubt because wool was able to take a full spectrum of dyes; linen was more variable in quality. One of the finest items of clothing at Berenike, surviving in five fragments of wool, had a medium-weight tabby with brown and purple S-spun yarn in one system, dark blue to green S-spun yarn in the other.[63] This item may be unconnected with the long-distance trade, but it is interesting to note that multi-coloured textiles are one of the items mentioned in the *Periplus*.[64]

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60 Pliny *NH* 6.20.54; Lucan *Pharsalia* 10.169–171; *Hou Han Shu* 88.12 (painted with gold); *Weilüe* 12. On the issue of reworked silk, or hybrid fabric products see Liu (2017): 3–5. For advocates of the view that these silks were re-exported (possibly back to the Chinese themselves) see Thorley (1971): 77–78; Leslie and Gardiner (1996): 227; Galli (2017): 7. However, for the suggestion that the Da Qin who reworked Chinese silk were from Central Asia and not the Roman Empire see Zhao (2017): 100–102.

61 *Edict of Maximum Prices* 20.1–13, 23.1–2, 24.1–16. For the Edict, and other inscriptional evidence relating to silk working and trading in the Roman Empire, see Evers (2016): 74–79; Hildebrandt (2017): 39–45.

62 Wild and Wild (1996): 251; Wild and Wild (1998): 230–236. It is possible some Egyptian s/s spun cotton could have been grown in Egypt—Wild and Wild (2007): 227.

63 Wild and Wild (1996): 245–248; Wild and Wild (2000): 252, 256, 264; Sidebotham and Zych (2011b): 36.

64 In fact, a *dipinto* on a broken piece of pottery (probably a reused amphora) from Berenike

There is an absence of statistical data regarding the volume of exports, and the *Periplus* offers merely vague statements, such as the demand for tunics 'in quantity' at the port of Malao.[65] One gets a general impression, however, that during the mid-first century CE a greater variety of textiles were going to East Africa and southern Arabia than to the Indian subcontinent, while in the subcontinent itself the northwest demanded a greater variety and number of textiles than the south. Unsurprisingly, higher-quality garments were in demand at the royal courts. In the absence of any data about prices in these markets, there is no way to determine if the Roman Empire experienced a trade surplus or deficit in the exchange of textiles in the Indian Ocean. It may be tempting to assume that products like silks and Seric furs were more costly in many markets than Roman linen or woollen textiles, but even this proposition is meaningless in the absence of data on the volume of imports and exports. Furthermore, it is undoubtedly the case that processes such as dyeing, as well as the quality of the weaving by artisans, impacted on the esteem of Roman textiles in ways that cannot easily be measured.[66]

Drugs, Dyes, Spices, and Compounds

It is abundantly clear, despite the lack of precise figures, that spices and aromatics were imported into the Mediterranean world in substantial volumes. At the same time, it is important to recognise that a range of plant, animal, and mineral products and compounds were exported as well. To be sure, the literary sources give the impression of a far greater variety of spices and aromatics coming from India, Arabia, and East Africa. Nevertheless, the *Periplus* records the export of saffron, *cyperus*, storax, yellow clover, realgar (arsenic sulphide mineral), sulphide of antimony, and orpiment.[67] Many of these products are known to have been available in the Eastern Mediterranean, notably saffron and storax (an aromatic resin). *Cyperus* (a reed also purported to grow in Arabia) and yellow clover (a legume known to grow in Indian highlands) were exported to ports in those regions despite the possible availability of a local source. Classical literary authors record a variety of uses for saffron, notably

may allude to the transport of wool for weaving—*O. Ber.* 250; Bagnall, Helms and Verhoogt (2005): 102.

65 *Periplus* 8.

66 In Diocletian's *Edict of Maximum Prices* (23.1.1–2) purple dyed silk is over twelve times more costly than un-dyed silk.

67 *Periplus* 24, 28, 39, 49, 56 (saffron and *cyperus* to Muza, storax to Kane and the Barbarikon, yellow clover to Barygaza, realgar and sulphide of antimony to Barygaza, Muziris and Bakare, and orpiment to Muziris and Bakare).

as a yellow dye, as a component in perfumes, and for use in certain eye remedies. Storax was said to have been used in medicines, including ones to induce sleep. Sulphide of antimony (a sulphide mineral also known as stibnite) is found in silver mines and was used as both a cosmetic and a cure for sore eyes.[68] It cannot be assumed that Graeco-Roman uses for such goods were universal—medicinal practices are often culturally specific. That said, the extraction of dyes for colouring clothing is more of a practical issue, and may be cross-cultural.

The author of the *Periplus* also describes the export of unguents, of an unspecified mixture, to the ports of Muza and Barygaza. The former received unguents in moderate amounts, the latter only in limited quantity and of the inexpensive kind—except for the court of the king, which required fine unguents.[69] The ingredients of these unguents are not specified, so they may have included products from the Roman Empire or elsewhere. Possibly some of the plant products imported via the Indian Ocean were processed into new products for re-export to 'other lands of the Erythraean Sea littoral'.[70] It is interesting that the *Hou Han Shu* associated Da Qin with the concoction of perfumes, but it is difficult to know if that notion was contemporary (fifth century CE) or derived from earlier sources used by Fan Ye.[71]

Some unguents in the Roman Empire were said to be worth 400 *denarii* per *libra*, which at least gives an idea of the potential profit to be made from exporting perfumes and fragrant mixtures. Pliny mentions the re-working of frankincense at Alexandria, though he does not specify if some of it was exported to foreign markets. It is possible that some of the unguents exported included foreign plant products. Indeed, Pliny states that Arabia had a surprising demand for foreign scents (no specific places of origin are mentioned), since men tire of what is their own and crave the things of others.[72]

68 Saffron—Dioscorides 1.26; *O. Tait.* 2181; *Periplus* 24; Pliny *NH* 21.17.31–34; Casson (1989): 152–153. *Cyperus*—Casson (1989): 153; Dioscorides 1.4; *Periplus* 24. Storax—Dioscorides 1.66; Pliny *NH* 12.40.81; Groom (2002): 94; Casson (1989): 163–164. Yellow Clover—*Periplus* 49; Dioscorides 3.40; *Periplus* 49; Pliny *NH* 21.87.151; Casson (1989): 207–208. Realger—Dioscorides 5.122; *Periplus* 49, 56; Pliny *NH* 34.55.177; 35.12.30; Casson (1989): 208. Sulphide of antimony/stibnite—Dioscorides 5.99; *Periplus* 49, 56; Pliny *NH* 33.33.101–102. Orpiment (yellow sulphide of arsenic)—Dioscorides 5.104.2; *Periplus* 56; Pliny *NH* 34.55–56.177–178.

69 *Periplus* 24, 49.

70 Sidebotham (1986): 180.

71 See Leslie and Gardiner (1996): and Hill (2015).

72 Pliny *NH* 12.32.59 (re-working frankincense); 12.38.78 (Arabians importing foreign scents); 13.4.20 (400 *denarii* for perfume).

Ostraka have also revealed the transport of drugs and medicines, or possibly dyes, at the Red Sea ports.[73] The Nikanor archive mentions the receipt of a *pharmakon* (in the singular) at the port of Myos Hormos, twice by Gaius Norbanos, once by Tiberius Claudius Agathokeous, and also once by an individual whose name does not survive.[74] In three of these cases, the volume given is one or two measures (what this equates to exactly is uncertain). McLaughlin believes this product was intended as crew provisions.[75] However, in *O. Petr.* 257, the volume is recorded as four cargoes of eight *metrêtês* of *pharmakon*. Since a *metrêteon* is a liquid weight of 37.4 litres, the total volume must have been about 300 litres. Its intended use is not stated, but, given its volume, it seems likely it was for export. Furthermore, if the *pharmakon* in this ostrakon does refer to dyes rather than drugs, it would not have been for crew provisions.

The export of dyes is potentially also suggested by papyrus *P.CtYBR inv. 624*, which mentions the word ψιττάκινος (an adjective meaning parrot-like). Peppard translates this as parrot-dye, although he notes it could mean parrot-cloth. The text is fragmentary, but it appears to be a product exchanged with/by the *barbaroi*, which Peppard has identified as the Barbaroi of the *Periplus* (who lived around the modern Somali coast).[76] However, as the nomads of the Eastern Desert were also referred to in such terms, it may be best not to designate the location more precisely than somewhere around the Red Sea or the Horn of Africa.

None of the plant or mineral products described as exports in the *Periplus* have been discovered in the archaeological record at either Myos Hormos or Berenike. However, the remains of murex, a shellfish from which purple dyes can be extracted, have been found at Berenike.[77] Purple dye appears to be mentioned in one of the ostraka from the Nikanor archive, and, given the high value of the product, it would not be surprising if it was exported.[78] Also found at Berenike is balsam, another highly valued product within the Roman Empire. It is not mentioned in literary sources as an export product, but its desiccated and

73 See Rathbone cited in Cuvigny (2006e): 639–694, who argues that when *pharmakon* is referred to in the singular it does not designate a drug, but a dye or cleansing agent.

74 *O. Petr.* 244, 257 (Gaius Norbanus), 275 (Tiberius Claudius Agathokeous), 283 (unknown).

75 McLaughlin (2010): 31.

76 *P.CtYBR inv. 624*—Peppard (2009): 195–196; *Periplus* 6.

77 Van Neer and Lentacker (1996): 338–339; Van Neer and Ervynck (1998): 356–357, 370. See also Cardon, Granger-Taylor and Nowik (2011): 311–312.

78 *O. Petr.* 264; see Cardon et al. (2004): 145–154, for the high value of purple dye, and its use alongside other dyes found on textiles on the Myos Hormos route; see also J. Wild (2004): 25, for sources of different dyes.

charred seeds have been found in layers of the first and second centuries CE.[79] It is said by Pliny to have possessed a fine odour and to have only grown in Judaea until the first Jewish-Roman war (66–73 CE), when the plant was captured and transplanted. Its cuttings, termed *xylobalsamum*, were worth six *denarii* per pound. At least within the Roman Empire it was used to make perfume, a sextarius (567 millilitres) of which could sell for 300 *denarii*, or 1,000 *denarii* with adulteration.[80] There is no explicit statement in any source to confirm that balsam was valued or appreciated in East Africa, Arabia or India, but the possibility of its export remains.

Animals

There is very little evidence for the export of live animals, beyond a few references in the *Periplus*. The king and governor of Muza accepted horses and pack mules, while the king of Saubatha accepted horses through the port of Kane.[81] No reference, impressionistic or quantitative, gives any sense of the volume of this trade.

Slaves

The export of slaves also receives scant mention in the *Periplus*. Only to the port of Barygaza are slaves reported to have been shipped, and then just for the king, who desired slave musicians and beautiful girls as concubines.[82] In the Indian play by Kālidāsa (c. 400 CE) there is a reference to *Yavanyah*, who appear to be female attendants acting as archers.[83] However, any connection to a trade in slaves from the Roman Empire is tenuous. As has been discussed in Chapter 5, the term Yavana, especially at this late date, need not necessarily denote a person from the Mediterranean world. The impression given by the *Periplus* is that slaves were exported as novelties and not necessarily on a large scale.

Glassware and Raw Glass

The Roman Empire imported glass via the Indian Ocean primarily in the form of beads, perhaps intended to imitate precious stones. The export of glass from the Roman Empire, however, appears more varied, consisting of finely crafted

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79 Cappers (2006): 80–82.

80 Pliny *NH* 12.54–55.111–123.

81 *Periplus* 24, 28.

82 *Periplus* 49.

83 Thapar (1999)—Kālidāsa *Śakuntalā and the Ring of Recollection*; see also Tarn (1938): 374; and McLaughlin (2010): 45 n. 178, who have attempted to connect these references to a trade in slaves.

objects as well as beads and raw glass. Raschke was sceptical about glassware as an object of long-distance commerce, since he believed fine glass was too fragile.[84] The logic of his argument, however, is not borne out by the archaeological evidence. That said, fine glassware (and, for that matter, thin-walled ceramics) were certainly risky items to export, since once damaged they lost their value as crafted objects and were effectively reduced to cullet. As a result, it must have been worth the risk to transport these objects.

Pliny states that since glass had come to resemble rock-crystal its own value had increased without lowering that of its rival. This may be connected to the belief held by his contemporaries that Indian glass was made of broken crystal, with which no other glass compares.[85] The form this glass took is not clear, nor is it certain whether the material was, in fact, glass. Whatever the case, the fact that glass was being conflated with rock-crystal attests to its high value, for Pliny notes that the latter substance was the most expensive product on the earth's surface.[86] That fine glassware was highly valued further underlines the point that these items must have been sufficiently profitable to make long-distance export worthwhile.

The picture presented in the *Periplus* is that glass beads, possibly like those imported into the Roman Empire, were exported to the East African coast (to the Barbaroi, Avalites, and Rhapta). Little is stated about the export of glassware to this region, though Casson believes the reference to the myrrhine that went to the Barbaroi does not correspond with the extremely expensive stone myrrhine vessels (fluorspar) which came from Iran (Petronius is said to have owned a fluorspar ladle worth 300,000 *sestertii*), but rather denotes the imitation millefiori glass from the Thebaid.[87] If it was a glass imitation, it is likely that it was still highly valuable. The author of the *Periplus* does not specify the export of any types of glass to the Arabian ports. The Barbarikon (located near the Indus) was said to have had a market for glassware, though the quantity or quality is not stated. On the northwest coast at Barygaza and at the southern India ports of Muziris and Bakare, only a demand for raw glass is specified.[88]

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84 Raschke (1978): 628.

85 Pliny *NH* 36.66.192, 37.10.29.

86 Pliny *NH* 37.78.204.

87 *Periplus* 6, 7, 17 (perhaps also to Mundu and Mosyllon—10, 11); Casson (1989): 111–112, 126–127. On Petronius see, Pliny *NH* 37.18–22. For finds of millefiori glass at Berenike see Sidebotham and Zych (2012b): 141.

88 *Periplus* 39, 49, 56. It was often cheaper to import raw glass or cullet for melting and remoulding than to make to make glass itself from raw materials. Indian glass was frequently brittle and low quality—Carboni (1991): 222.

The picture presented by the *Periplus* is one where the demand for glassware was confined to parts of the East African coast, with no apparent interest in glassware from most of India and southern Arabia.

The archaeological record provides material that in some instances confirms, but in others contradicts, the impression given in the *Periplus*. At Berenike, some high-quality glassware, including colourless luxury wares, *reticella*, millefiori, mosaic, gold glass, folded gold glass, silver glass and false gold glass beads with copper foil, has been discovered. They may have originated in Alexandria or Rhodes. Some of these types of glass were clearly exported, like the *reticella* glass, which has also been found at ed-Dur and Taxila (India); mosaic glass at Heis (East Africa); fragments of painted, mosaic, pillar/ribbed glass and glass game pieces (*oculi*) have been found at Pattanam (Muziris); while pillar/ribbed glass has even been found as far away as China.[89] At Myos Hormos, numerous blue glass beads have also been discovered with first century CE material.[90] Many of these glass vessels appear to be of Syro-Palestinian, Italian, and (mostly) Alexandrian origin.[91] The colourless glass was of particularly high quality.[92]

Roman glass vessels have been found at Hafun West in Somalia (possibly Opone). The site of Heis, thought to be the Mundu of the *Periplus*, has also revealed such vessels, including mosaic glass that probably came from Egypt. This is similar to the mosaic glass found at Axum alongside mold-cast colourless plates, dating between the first and fifth centuries CE.[93] The remains of Roman glassware found in southern Arabia are in stark contrast to the silence of the *Periplus*: this includes finds at Timna, Al Ara, Ras el Ara, Umm Hogarth and Soukiya. In addition, Mediterranean glassware was found in first century BCE to first century CE levels at Khor Rori (Moscha Limen).[94] It is possible that at some of these sites the glass was brought via the overland route from Petra.[95] However, the finds at the port of Khor Rori probably came via the sea route.

89 Francis (2000): 216; Kucharczyk (2011): 84, 86, 89–92; Cherian and Menon (2014): 66–71. More generally on ed-Dur see Salles (2016): 143–146.

90 Copeland et al. (2006): 135 (blue beads); Roth (1979): 144 (first century CE dating).

91 Roth (1979): 144; C. Meyer (1992): 46; Kucharczyk (2011): 84–86.

92 C. Meyer (1982b): 220.

93 Casson (1989): 127; C. Meyer (1992): 133; Tomber (2007): 981; Tomber (2008): 95–96.

94 Sidebotham (1986): 16; C. Meyer (1992): 17–18 (glassware in Southern Arabia); Lombardi, Buffa, and Pavan (2008): 402 (Moscha Limen).

95 Young (2001): 104–106; Tomber (2008): 102.

Again, contrary to the silence of the *Periplus*, glassware has been found distributed across the Indian subcontinent. In southeast India, at the port of Arikamedu, Syro-Palestinian ribbed bowls similar to those at Taxila and Dharanikota have been discovered, along with an opaque light blue dish of very high quality, paralleling finds in the west of the Roman Empire. Stern believes that the limited quantity of glassware found at Arikamedu is indicative of a Roman merchant community.[96] However, as has been noted already, it is by no means certain that this material is representative of resident Romans, and probably simply reflects an Indian appreciation for Roman glassware. Other wares of probably Eastern Mediterranean origin have even been found around the port of Mantai in Sri Lanka, dating between the first century BCE and the first century CE, while the inland site of Anuradhapur has revealed Eastern Mediterranean glassware, also dating between the first century BCE and the first century CE.[97] In central and western India, blue glass beads and bangles of probable Roman origin have been found at Brahmapuri, Nevasa, and Bhokardan, while fragments of Roman glass have also been found at Paithan, Nevasa, and Ter.[98] At Ter (in the Deccan), two rims of a glass cup and a bottle (early first century CE) have been found, similar to a bottle that has been discovered at Taxila-Sirkap (Pakistan).[99]

In the northwest subcontinent, the site of Taxila-Sirkap has revealed Roman glass, including a fragment from a Julio-Claudian cameo skyphos.[100] Around 150 Roman glass objects have been found at Begram (Afghanistan), including a crystal vase representing the lighthouse at Pharos, a glass ephebe, and a tall goblet with beehive design (Egyptian parallels) painted and decorated with classical scenes. Ribbed bowls with parallels from ed-Dur and Arikamedu strongly suggest that most if not all of the Begram glassware (which had all been sealed together with other objects in two rooms in the first century CE) came via the Indian Ocean trade routes. Whitehouse believed that stylistically many of these glassware objects may range in date from 50–125 CE, but recent re-examination makes it clear that they definitely date to the first century CE.[101]

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96 Stern (1991): 117; see also Wheeler, Ghoash, and Deva (1946): 102.

97 For Mantai see Tomber (2007): 980. For Anuradhapur see Coningham and Batt (1999): 129; Muthucumarana et al. (2014): 42.

98 Gupta, Williams, and Peacock (2001): 15; Singh (1988): 87–88.

99 Stern (1991): 115.

100 Whitehouse (1989b): 95.

101 For the Begram glass see Whitehouse (1989b): 94–96; Whitehouse (1989a): 151–157; Suresh (2004): 134; Brancaccio and Liu (2009): 222; Mehendale (2010): 131–135, 40; Cambon (2011):

The objects found at Taxila and Begram were probably carried inland from the port of Barbarikon since all cargoes were brought upriver to the king of Scythia.[102]

Stern argues that the greater number of glass vessel fragments found in the northwest of the Indian subcontinent compared to the south may corroborate the picture presented in the *Periplus*.[103] However, it is methodologically insecure to try and determine the relative volume of trade based on the number of finds in different sites in India. The circumstances surrounding the Begram finds are particularly fortuitous, since many objects had been collected together and sealed into two rooms, either as a "treasure room" or a merchant's storehouse.[104] Meyer notes that because in the past Indian archaeological reports have tended to focus on recording and publishing whole or nearly intact vessels, thousands of small, thin sherds have probably been discarded. The result of this is an underrepresentation of the scale of glass exports.[105] Thus, it would be more beneficial to examine the distribution of this glass, rather than compare the number of finds between different sites.

Moving to raw glass, the demand for this product in Barygaza, Muziris, and Bakare has been noted. In terms of archaeological finds, Suresh believes that raw glass found at Nevasa, Brahmapuri, and Ter could be Roman, due to associated finds of Roman pottery and coins.[106] The problem with this theory is that these discoveries were made at sites far inland (central-western India), and it is entirely possible that the pottery and coins were merely distributed to areas where glass was locally manufactured. There is evidence, however, for the transport of raw glass to the Red Sea ports. This is indicated by two large blocks of blue glass of similar weight (produced at Alexandria) that were dumped at Didymoi. It has been suggested that they were intended for export but had been damaged or lost in transit, though their ultimate destination can only be speculated about.[107] That such items were being transported via the Indian Ocean is revealed by the finds of black, green, and blue ingots from the shipwreck near

152–153—all pieces are Roman, originated in Egypt and belong to the same chemical family. More generally on the first century CE date of the finds from Begram see Graf (2017): 475–476.

102 Stern (1991): 114; Whitehouse (1989b): 95; Mehendale (2011): 140; *Periplus* 38–39. On earlier "Greek" influence in Bactria (Afghanistan) see Francfort et al. (2014); and Rapin (2007).

103 Stern (1991): 119–122.

104 Mehendale (2011): 142–143; Cambon (2011): 149–150.

105 C. Meyer (1992): 73–74.

106 Suresh (2004): 136; see also Margabandhu (1965): 321.

107 Cardon et al. (2004): 145. See also Brun (2011b): 225–226.

Godavaya, Sri Lanka, dating from around the second century BCE to the first century CE, based on radiocarbon analysis of wood samples.[108] This is probably a South Asian ship, but at least it attests to the existence of a trade in raw glass.

There is some evidence of glass-working in Roman Berenike, while glass slag and, more recently, quartz lumps have been found at Myos Hormos.[109] However, it is debatable whether these ports manufactured glass at the sites.[110] The primary components in traditional glass making are silicate and alkaline materials. The former is present along the Red Sea, and the latter derives from former marine lagoons, as well as basins or depressions filled with sea or river water.[111] Myos Hormos' location seems to fit these conditions, so glass may have been manufactured at this port. There is, of course, no proven link between the statements in the *Periplus* about the export of raw glass, the potential evidence for glass manufacture at Myos Hormos, and the raw glass found with surrounding Roman material in India. Stern suggests that raw or unworked glass may have been sufficiently profitable to use as ballast.[112] This is almost certainly correct, or there would have been little incentive to export it.

Stone Objects and Terracottas

Objects crafted of harder materials were also exported, in the form of statuary and bowls. The author of the *Periplus* only records a demand for statuary by King Eleazos of the frankincense-bearing land; the items arriving via the port of Kane.[113] However, excavations across the Indian subcontinent have revealed finds of stone objects. At Begram, a Roman alabaster dinner plate has been found, as well as some porphyry pieces, including a vase, which must have come from the quarries of the Eastern Desert of Egypt.[114] Another alabaster object of skilled and delicate Graeco-Roman craftsmanship was discovered at Junnar, in western India. It comprised half an egg with a child, probably Eros, lying inside, indicating the birth of the god, and is thought to be of Alexandrian ori-

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108 Carlson and Trethewey (2013): 9, 13; Bopearachchi, Disanayaka, and Perera (2016): 416, 419, 424–425.

109 Sidebotham (2011a): 116 (Berenike); Sidebotham (1986): 30 (Chicago excavations—glass slag); Peacock et al. (2006b): 86 (Southampton excavations—quartz lumps).

110 Roth (1979): 144 (positive view regarding Myos Hormos); Kucharczyk (2011): 92 (sceptical at least as regards Berenike).

111 Fiori and Vandini (2004): 179–178.

112 Stern (1991): 114–115.

113 *Periplus* 27–28.

114 Mehendale (2011): 133 (alabaster); Cambon (2011): 150, 153 (porphyry).

gin. As noted in Chapter 5, Dhavalikar suggests that it was brought along as a souvenir or belonged to a Yavana resident at the site.[115] However, the existence of a Roman diaspora at this site has been questioned. Similar myths surrounding the creation of the universe from an egg existed in both the Graeco-Roman world and India.[116] Therefore, it is quite plausible that this item was owned and appreciated by a local resident. Overall, the number of Indian sites which have revealed Roman stone products is limited thus far.

It is difficult to be sure whether the silence in the *Periplus* suggests that these items were exported in low volumes or merely that the author considered them unworthy of mention. Such stone objects would have been useful in terms of ballast and stowage for vessels, and were presumably profitable to export. Indeed, there is evidence that Mediterranean marble was traded with the port of Adulis, on the East African coast.[117] The Godavaya shipwreck revealed among its cargo five finished stone querns (including grinding stones and bench shaped querns), among other items like ceramic bowls. As noted earlier, the ship may have been southern Indian in origin, but it still indicates the feasibility of Roman vessels carrying stone commodities of functional and artistic value.[118]

Another class of objects not traditionally associated with Roman exports to India are terracottas. At Arikamedu, two Roman lamps have been found almost intact, and figurines, which are not genuinely Roman but appear to be copies, have been identified. What has been identified as a Graeco-Roman head, with a spiked helmet and beard, has been found at Kodumanal.[119] Whether these terracottas were intended as artistic models to be copied or artistic objects in their own right is difficult to discern.

Non-precious Metals: Copper, Brass, Bronze, Iron, Lead, and Tin

Merchants from the Roman Empire exported non-precious metals in two major categories: first, as a basic material in the form of ingots, as suggested by the shipwrecks at Bet Dwarka (Gulf of Kachchh, Gujarat) and Abu Fendera (Red Sea); and second, in the form of crafted metal objects appreciated for their aesthetic quality.[120] When discussing imports, it has already been noted that iron

115 Deo (1991): 41, 43; Dhavalikar (1992): 325–327.

116 Mitchell forthcoming.

117 Seland (2014): 381.

118 Carlson and Trethewey (2013): 9, 13–14; Muthucumarana et al. (2014): 56.

119 Suresh (1992): 53–55; H. Ray (1994): 76.

120 Bet Dwarka—Gaur, Sundaresh and Tripati (2006): 117–127; see also Gaur and Sundaresh (2016): 204; Abu Fendera—Blue, Hill and Thomas (2012): 94–96.

and steel came to the Roman Empire via India. In return, the Roman Empire exported a variety of metals, including brass, iron, tin, lead, and copper, with different metals being in demand across East Africa, Arabia, and India.

Copper is clearly attested as an export of the Roman Empire in the literary sources, although archaeological attestations are limited to date (not counting the copious numbers of Late Antique Roman coins found in India and Sri Lanka). The author of the *Periplus* reports that copper as a basic material was demanded in various ports in India and Arabia (Kane, Barygaza, Muziris, and Bakare). The author also notes that crafted objects were desired in East Africa and Arabia. Copperware of an unspecified nature was given to the kings and governors at the port of Muza, while copper honey pans were exported to Barbaria and Malao, as well as drinking vessels to the latter.[121] The picture presented is complemented by the testimony of Pliny, a (near) contemporary, who states that India does not possess copper (which is untrue), but procures it in exchange for her precious stones and pearls.[122]

A crafted Roman copper object has been found at the site of Brahmapuri, in Maharashtra. This is a repoussé copper *emblema* depicting the legend of Perseus and Andromeda, popular in Roman art of the first two centuries CE.[123] In isolation, this piece might appear anomalous, but when considering the bronze wares found in India (see below), it becomes reasonable to assert that such crafted metal wares were not an irregular export.

Brass, an alloy of copper with zinc, is briefly mentioned by the author of the *Periplus*. He asserts that it was exported to the Barbaroi for making ornaments and cutting up coins.[124] Bronze, an alloy of copper with tin (and sometimes other elements), is not mentioned at all in the *Periplus*. This absence strongly contrasts with archaeological fieldwork at several sites across India and Arabia, which have documented finds of bronze crafted objects. In the case of Arabia, bronze objects of Hellenistic and Roman influence or design have been found at Tamna (Yemen). This includes two bronze statuettes thought to represent Dionysos riding a lion (75 BCE–50 CE).[125]

Bronze objects of Roman craftsmanship appear at sites across the Indian subcontinent. To mention a few examples, in the northwest, a bronze plaque of Atlas has been found in Taxila (Pakistan), while at Begram (Afghanistan)

121 *Periplus* 6, 8, 24, 28, 49, 56.

122 Pliny *NH* 34.48.163; See Casson (1989): 28–29, who regards it as especially odd that Barygaza would import copper given its availability in Rajasthan.

123 Suresh (2004): 125.

124 *Periplus* 6; Casson (1989): 112.

125 Glanzman (2002): 129.

a statuette of the god Harpokrates wearing the crowns of Upper and Lower Egypt has been unearthed (paralleling one found at Taxila). Other finds at Begram include a statue of Serapis-Herakles, a mask of Seilēnos (a follower of Dionysos), bronze busts of Athena and Ares (possibly cosmetic jars in origin), and a bronze pitcher. Reinterpretations of these objects reveal that they date within the first century CE.[126] At Baroda/Vadodara (Gujarat), a bronze handle with a figure of Eros has been found.[127]

In central-western India, at the site of Brahmapuri (Maharashtra), two large bronze pots were found in a house from the Satavahana period (first to third centuries CE), containing a total of 102 smaller objects.[128] Thirteen of these can be categorised on stylistic grounds as Roman bronze imports, including a fragmentary bronze sieve used to strain wine.[129] An incomplete bronze handle found at Kolhapur (Maharashtra) has been identified as part of a Roman oinochoe, sharing parallels with finds from Pompeii.[130] Two bronze mirrors, one with a lid cover, were recovered from Ter. These are similar to finds from Kolhapur.[131] A possible Mediterranean bronze dish has been recorded at Nevasa.[132] In Nilgiris (Tamil Nadu), a sculpture of a Roman priest sitting on a chair with a thunderbolt in his left hand has been discovered. On its pedestal is the legend 'ROMAE'. Finally, a possible Greek-style bronze jug has also been identified at Avinasi (Coimbatore).[133]

These finds reveal that bronze objects were distributed widely across the Indian subcontinent, and that they comprised in particular Graeco-Roman religious objects and culinary utensils. Several theories have been proposed to explain the presence of these objects. The first theory suggests that they served as gifts to Buddhist communities that played an important role as agents and financiers for Indian traders in this period. The second theory is that some of them formed part of the paraphernalia connected to wine consumption.[134] De Puma proposes a third theory, with regard to the Roman bronzes from the Brahmapuri hoard: namely, that these items, alongside other metal objects

126 Taxila—Khandalavala (1992): 329; Begram—Mehendale (2011): 140–141; Cambon (2011): 154, 180; also see Whitehouse (1989): 95.

127 Singh (1988): 72.

128 Suresh (2004): 124–125.

129 De Puma (1991): 95 (wine strainer); Suresh (2004): 125.

130 De Puma (1991): 101–102 (parallel at Pompeii); Suresh (2004): 128; Tomber (2008): 131.

131 Deo (1991): 41.

132 Singh (1988): 87–88.

133 Suresh (1992): 53; Suresh (2004): 126.

134 Suresh (2004): 131–134.

found there, were intended for disposal at a nearby foundry—hence, they were merely imported as raw material. However, in this case such a theory appears unlikely, since the hoard contained different metals, such as lead and iron, suggesting it that had not been assembled for smelting.[135] In light of the evidence from Gandhara, which shows the consumption of wine, Dionysiac scenes on Buddhist friezes, and the evidence of paraphernalia associated with wine consumption, a combination of the first two theories probably explains many of the bronze craft wares found in India. The prestige associated with owning a finely crafted foreign object was no doubt an important factor as well.

Once the utility and appeal of these metal objects had passed, they could easily be melted down and recast. It is likely, therefore, that the number of surviving objects is not a fair representation of the volume in which they were imported to India (and other regions). Suresh believes that the number of bronze objects found is limited because their ownership was restricted to the upper echelons of Indian societies. His argument is that indigenous bronze utensils do not seem to have been commonly used among the wider population, thus making foreign bronze wares largely high-value prestige objects.[136] However, this need not preclude a more restrictive group of wealthy individuals acquiring many such objects. Furthermore, not all the Roman bronze wares were utensils—some were objects of high aesthetic value. The popularity of imitating Roman coins and turning them into jewellery (with double piercings for attaching to a necklace or a piece of clothing) demonstrates that Graeco-Roman artistic imagery was appreciated in India.[137]

To turn to iron, it has been noted that this item could be acquired from India, although the author of the *Periplus* reports that it was exported from the Roman Empire to East Africa. This included iron and iron weaponry for the Barbaroi, iron to the port of Malao, and ironware of an unspecified nature to the port of Mosyllon.[138] The impression given is that these exports were utilitarian rather than high-prestige items, and likely served as ballast. There were iron workshops at both Myos Hormos and Berenike, but the extent to which they exported this metal (if at all) is unknown.

To come, finally, to tin and lead, the author of the *Periplus* states that a small quantity of tin was in demand at Avalites. It was also exported to Kane, Barygaza, Muziris, and Bakare. Lead is only mentioned as an export to Indian

135 De Puma (1991): 101; *contra* Suresh (2004): 133–134.
136 Suresh (2004): 131; followed by McLaughlin (2010): 47.
137 Suresh (1992): 31–33; Darley (2015): 78; Majumdar (2015): 421–422.
138 *Periplus* 6, 8, 10.

ports.[139] Just as with copper, Pliny stated that India produced no lead and acquired it in exchange for precious stones and pearls.[140] Casson notes that Early Historic India had plenty of lead, but suggests that these deposits were of galena, worked solely for their silver content.[141] Isotope analysis has shown that Sadakana and Kura lead coins of the pre-Satavahana period 'closely match those of Sardinian and Spanish lead sources exploited by Greeks and Romans up to AD 50.' By contrast, coins of the later Satavahana period used local lead sources.[142] Thus, it is possible that local metal sources in India were not fully exploited at certain periods, making it profitable for Roman traders to export such metals. The medieval Geniza documents reveal that even though the Malabar Coast had local sources of metals like lead and copper, they were still shipped to this region. Goitein suggests that supplies were perhaps insufficient to meet demand.[143] However, this trade in metals may in part be explained by a shipmaster's need to ensure the stability of his vessel through the conveyance of properly stowed ballast (as discussed in Chapter 8).

Precious Metals: Gold and Silver

Thousands of high-value Roman coins in the form of *denarii* (silver) and *aurei* (gold) have been discovered in India. These finds raise a number of complex questions about the nature of Roman trade in the Indian Ocean. However, it is worth leaving aside these coin finds for the moment in order to consider the export of silver and gold in the form of bullion and crafted wares. It is impossible to truly determine the ratios with which silver and gold were exported in the form of bullion, wares, or coins. The latter two do survive in the archaeological record, but the constant recycling of bullion means that much material will have been lost. Nevertheless, the written evidence can sometimes give an impression of their respective importance.

To deal with silver first, whenever it is discussed in the *Periplus*, it is referred to either as coinage or silverware.[144] In contrast, Strabo may imply that bullion was used at least in trade with Arabia, for he states that the Arabs received ἄργυρος (silver) and χρυσός (gold) in exchange for aromatics and precious stones. It is possible that this silver could be conceived of as taking the form

139 *Periplus* 7, 28, 49, 56.
140 Pliny *NH* 34.48.163.
141 Casson (1989): 28.
142 H. Ray (1991): 59.
143 Goitein (1980): 45–46.
144 *Periplus* 6, 10, 24, 28, 39 (silverware); 6, 8, 24, 28, 39, 49, 56 (money: both gold and silver or unspecified).

of ingots or bars, since he does not use the words νόμισμα (*nomisma*), δηνάριον (*denarion*), or χρήματα (*khrēmata*; singular—χρῆμα (*khrēma*)).[145] However, when referring to silver and gold elsewhere, he makes it clear that he has coins in mind.[146]

Ostraka and papyri from Egypt also provide an uncertain picture. An ostrakon from the Nikanor archive records the receipt of three bags of silver coin and one basket of silver plate at Myos Hormos, quite possibly intended for export.[147] A group of ostraka from the Berenike customs passes, known as the dossier of Sarapion, son of Kasios, include a dozen individual references to *marsippia* (μαρσίππια), meaning carrier bags or pouches.[148] The content of these bags is not explicitly stated, nor their individual weight—although some are recorded as being of 'double weight' (διπλᾶ). It is assumed that a *marsippion* must refer to a standard weight.[149] Large numbers of these bags were being transported—in one case, up to 235 of them.[150] Nappo and Zerbini argue that these bags contained coins, based on the parallel usage of the term *marsippia* in various papyri.[151]

McLaughlin supposes, on the basis of a text on weights and measures by Epiphanius (392 CE) and evidence from the Tesoretto Rimigliano shipwreck, that these *marsippia* could contain 125 coins (or 250 for double weight).[152] Assuming this is correct, the 235 bags mentioned in *O. Ber.* 162 would contain 29,375 coins. If these were *denarii*, they would amount to a value of 117,500 *sestertii*; if *aurei*, the value would equal 734,375 *sestertii*. Of course, this is all dependent on the bags containing precious metal coins mentioned in the dossier of Sarapion, son of Kasios, a premise that is not yet definitively proven.

On the face of it, such numbers appear spectacular, leading one to question the view that these bags were filled with such a high number of precious coins (though not necessarily that they contained them). The wholesale cost of a *mina* (511 grammes) of black pepper, which De Romanis reconstructs

145 Strabo 16.4.22.

146 See Strabo 4.2.3—using the term νόμισμα.

147 *O. Petr.* 290.

148 *O. Ber.* 159–160, 162–163, 165–166, 170, 172–174, 177, 182; Bagnall, Helms and Verhoogt (2005): 62–74. See also Cuvigny (2012e): 68–70; and Nappo (2017): 563–564.

149 Nappo and Zerbini (2011): 66–67; Nappo (2017): 564.

150 *O. Ber.* 159 (number of bags 56), 160 (160), 162 (235), 163 (112 double weight), 165 (67 double weight), 166 (160 double weight), 170 (73), 172 (160), 173 (21), 174 (68), 177 (119 double weight), 185 (5).

151 Nappo and Zerbini (2011): 67; Nappo (2017): 564–567.

152 Epiphanius *On Measures and Weights* 53; McLaughlin (2014): 84–86 n. 94.

from the Muziris Papyrus, was equivalent to six *sestertii*, which means the actual purchase cost for pepper in India would have been lower.[153] But even if we utilise a six *sestertii* figure, the collection of bags mentioned in *O. Ber.* 162, assuming they all carried 125 *denarii* each, would be enough to buy over 10,000 metric tonnes of black pepper, filling sixteen ships like the Hermapollon (with a capacity of c. 625 metric tonnes).[154] On the other hand, the fact that the 1847 Kottayam hoard may have contained as much as 8,000 *aurei* (see below) suggests that these numbers are not beyond the realms of possibility.

In relation to bullion, a papyrus from 117 CE mentions the fluctuating prices of uncoined silver at Koptos. Young assumes this was caused by the seasonal schedules of merchants trading in the Indian Ocean.[155] At most times, there was in the Roman Empire a free market in gold and silver bullion.[156] Consequently, the amount exported perhaps depended upon the prices at which it could be acquired. Nonetheless, it should be borne in mind that this papyrus does not explicitly make any connection with the Indian Ocean trade.

In contrast to the silence in the *Periplus* about the export of silver (or gold) in the form of uncoined bullion, various ports and regions in East Africa, southern Arabia, and India are said to have demanded silverware. The author reports a general demand at Mosyllon, but in other regions the demand was mainly connected to royal courts—specifically those controlling the ports of Muza, Kane, the Barbarikon, and Barygaza.[157] It is also stated that King Zoskales of the Barbaroi was keen to accept silverware fashioned in a local manner.[158] The number of identifiable Roman silverware objects in the archaeological record of these regions is limited, but a silver spoon has been found at Sirkap-Taxila, among many other Roman artefacts.[159]

Some of the royal courts evidently demanded silverware in large volumes, as is apparent from the demand for silverware at Kane. As Seland notes, the *Periplus* reveals that these courts often monopolised the import of goods and acted as centres for redistribution.[160] It is quite possible that this silver was

153 See Chapter 3.

154 117,500/6 × 511 g = 10,007mt.

155 *P. Giess.* 47; Young (2001): 50–51.

156 Howgego (1992): 10.

157 *Periplus* 10 (Mosyllon), 24 (Muza—embossed silverware), 28 (Kane—in large quantities), 39 (Barbarikon), 49 (Barygaza—precious silverware).

158 *Periplus* 6.

159 Whitehouse (1989b): 95.

160 Seland (2010): 4, 63, 76, 86.

not merely desired by those at the court itself, but exchanged or given away to a wider circle of elites. Whatever the precise demand for silverware was, these pieces were undoubtedly valued beyond their simple bullion content. The exchange of even a small number of items would represent a significant transaction.

As with silver, gold is also only mentioned in the form of coinage and crafted objects in the *Periplus*, while Strabo's aforementioned statement about the export of gold to Arabia for precious gems and aromatics is highly ambiguous.[161] In addition to these sources, one of the Sangam poems mentions how the Yavanas came 'in their great vessels' and exchanged gold for pepper, though the author does not specify in what form. Sidebotham argues that these represented coins and the source's failure to mention this merely indicates that Indians regarded them as bullion.[162] While there is no guarantee that this reference to Yavanas actually represents Roman merchants, there is good reason to think it might, since it conforms to the statement in the *Periplus* that Muziris and Bakare received a great deal of coins in exchange for malabathrum and pepper.[163] It is worth noting, though, that while these coins were valued for their bullion context, they were also appreciated as artistic objects. In some cases, they were turned into jewellery.[164]

The author of the *Periplus* gives the impression that the demand for gold ware was not as widespread as that for silverware. King Zoskales of the Barbaroi sought gold ware fashioned in a local manner, while the king and governor of Muza also accepted gold ware.[165] Some Sangam poems refer to Yavana vases and lamps in the form of animals or humans;[166] here Suresh assumes that large metal objects are implied. Vickers goes further, arguing that the reference to gold and silverwares in the *Periplus* means that these objects were probably made of precious metals. Roman terracotta objects have been discovered at Indian sites, including Arikamedu, Kanchipuram, and Ter. It may be that these

161 *Periplus* 6, 24 (gold ware); 6, 8, 24, 28, 39, 49, 56 (money: both gold and silver or unspecified)—referred to either as δηνάριον, χρῆμα, or χρήματα; Strabo 16.4.22.

162 Sidebotham (1986): 23–24, 29, 31—Tayan-Kannanar *Agam* lines 7–11.

163 *Periplus* 56.

164 Suresh (2004): 77–81. De Romanis (2012a): 170–171, has noted that if these coins were treated solely as bullion it is hard to see why they were not melted down immediately, why they were imitated and why there were exchanged at profit for local currency at Barygaza (*Periplus* 39).

165 *Periplus* 6, 24.

166 See the *Maimekalai* 19.1.45; *Mulleippattu* 5.49, 85; *Nedunalvadei* 101–103; *Perumpanarruppatai* 311–319.

were imitations of objects made of precious metals, as seen with the clay bullae imitations of Roman coins.[167]

While no gold wares of the type described in the Sangam literature have been recovered thus far, a wide variety of Roman items have been found in the Indian subcontinent (far more than silver), which is in marked contrast to the silence in the *Periplus*. Among the finds are a statue of Aphrodite at Taxila, paralleling the Bactrian Aphrodite at Tillya Tepe, and two Roman gold finger rings found within a hoard containing Tiberian *aurei* at Vellalur (Coimbatore). One of these rings depicts the image of a dragon and the head of a Graeco-Roman soldier, while the other is inlaid with violet-coloured garnet or amethyst that has an engraved image of a nude Greek female dressing her hair. A gold pendant, 4 centimetres in diameter, was discovered at Kampelayam (Tamil Nadu). The obverse contains a Graeco-Roman matron with a veil covering her head in the style of imperial ladies portrayed on Roman coins (for example, Livia and Faustina I).[168] To summarise, it is clear that not only Roman gold and silver coins were reaching India, but finely crafted objects and jewellery as well. As Pliny notes, the Romans were greatly skilled in engraving gold and silver in a way that substantially raised their value.[169]

Precious Materials: Gem Stones and Coral

The Roman Empire was predominantly an importer of precious materials like ivory, tortoiseshell and gems. A great many of these came from India. Nevertheless, the Mediterranean world was able to offer precious materials as well, though of a much less varied nature. The most notable of these was Mediterranean red coral (*Corralum rubrum*), a product prized both in the Roman Empire and in India. It was said by Pliny to have been harvested in particular from the islands called the Stoechades (modern Îles d'Hyeres), in areas close to the Aeolian Islands (off the north coast of Sicily), and around the town of Drepana (near modern Trapani) in the Strait of Sicily. He further states that coral was esteemed in India in the same manner that pearls were esteemed in the Roman world, purportedly because coral had sacred properties for protection and was highly valued as an ornament and object of devotion. This

167 Suresh (2004): 79–81, 138–139; Vickers (1994): 243.

168 Cambon (2011): 154 (Tillya Tepe); Suresh (1992): 55; Suresh (2004): 146 (Vellalur), 148–149 (Kampelayam). For parallels see RIC 1.43 (Livia—*dupondius*), RIC 362v (Faustina—*denarius*).

169 Pliny *NH* 33.2.4. For methods of jewellery making in the ancient Mediterranean see Higgins (1961): 8–38.

demand caused it to become rare even in regions that produced it.[170] The origin of Pliny's knowledge about Indian uses of coral is unknown, but Indian sources do reveal it was highly prized.[171]

Strong demand for red coral is also reflected in the *Periplus*, where it is mentioned as an export to the Barbarikon, Barygaza, Muziris, and Bakare, as well as the Arabian port of Kane.[172] The author does not specify the type of coral but it was probably Mediterranean red coral, rather than the inferior Red Sea coral.[173] Indeed, the contrast between these two coral types is attested from the five worked beads of Mediterranean red coral at Berenike (thought to have been cut at Alexandria).[174] Coral has been found at Begram, alongside Roman objects (therefore dating to the first century CE).[175] Furthermore, Mediterranean red coral beads have been recovered from the port of Manthai (Sir Lanka) and from a stupa deposit at Mirpur Khas (Sind), broadly dating to the early first millennium CE.[176]

Another highly prized material is peridot, a precious gemstone ranging from transparent to translucent and typically olive green in colour.[177] The author of the *Periplus*, Strabo, and Pliny all mention its export to India. The former calls it *chrysolithon* (golden stone), while both Strabo and Pliny refer to it as *topazos*. Despite the different appellations the similarity of their descriptions all but guarantee they are talking about peridot, which for the Romans was only available at St. John's Island (Zabargad) in the Red Sea. The mining of this stone dates back to the Ptolemaic period, and clear links between the island and Berenike are evidenced by copious peridot crystal fragments found at the port. Typological similarities of the pottery at the two sites also demonstrate a connection.[178] It is said in the *Periplus* to have been in demand at the Barbarikon, Barygaza, Muziris, and Bakare. The author also states that (unspecified) pre-

170 Pliny *NH* 32.11.21–23.

171 Kautiliya *Arthasastra* 2.11.42; *Garuda Puranam* 68, 80; *Ratnapariksa* 250–252. One variety of Red Coral was specifically associated with Alexandria (*Alakandaka*)—Sircar (1971): 233.

172 *Periplus* 28, 39, 49, 56.

173 Casson (1989): 163; for the more prosaic use of Red Sea coral at Berenike see Van Neer and Ervynck (1999): 327; also Zych et al. (2016): 333, 336, 342.

174 Francis (2000): 213.

175 Cambon (2011): 150.

176 Liu (1988): 56 (both sites); Bopearachchi (1998): 147–148.

177 Harrell and Bloxam (2010): 18.

178 Pliny *NH* 37.42.126, 52.136; Strabo 16.4.6; Casson (1989): 190; Harrel (1996): 112; Harrell and Bloxam (2010): 18–21.

cious stones were desired at Mosyllon on the East African coast, although it could not be stated definitively if peridot was among this group.[179]

Finally, it is possible that emeralds were exported from the Roman Empire during the Principate, although this is a matter of contention. Emeralds have been found in numerous trenches at Berenike, mostly coming from the local beryl and emerald quarries of Gebel Sikait and Gebel Zabara to the northwest of the port.[180] These mines appear to have been active in the Ptolemaic, early to late Roman (primarily), and Islamic periods.[181]

The possibility that emeralds were exported should be given some weight in light of their comparative abundance in the layers at Berenike. Those who argue against this view note the relatively poor quality of the emeralds obtained from the Eastern Desert of Egypt, in addition to the silence of the *Periplus*.[182] Furthermore, Pliny states that higher-quality emerald was available in Bactria (roughly Afghanistan), indicating an alternative source for the Indian markets.[183] However, by the sixth century CE, Cosmas mentions that the Axumites had acquired emeralds from the Blemmyes, who controlled the emerald mines of the Eastern Desert (if Olympiodorus is to be believed they do so from at least the early fifth century CE). Cosmas states that these emeralds were exported to India, and that they were exchanged for high value wares.[184] This statement would seem to confirm that Eastern Desert emeralds could quite feasibly have been exported during the Principate.

Summary: The Export of the Roman Empire

Having examined the variety of products exported from the Roman Empire, it is apparent that the written (literary texts, papyri, ostraka, epigraphy) and archaeological evidence are complimentary in many instances. This is most

179 *Periplus* 10, 39, 49, 56.

180 Harrel (1996): 112; Sidebotham and Zitterkopf (1996): 382; Harrel (1998): 142–143; Sidebotham (2000c): 356; Tomber (2016): 50.

181 Shaw (2002): 249–250; Sidebotham et al. (2004): 7–30, esp. 22–23. The evidence primarily attests to late Roman activity, but this picture is skewed by the limited excavations which have taken place so far.

182 Harrel (1999): 120 (not mentioned in the *Periplus*); Harrell (1996): 112; Harrell (1998): 142–143; Sidebotham and Zitterkopf (1996): 382; Sidebotham (2000c): 356; Wendrich et al. (2003): 57 (emeralds low quality).

183 Pliny *NH* 37.5.17.

184 Cosmas *Christian Topography* 11.339; Olympiodorus 35.2 = Photius Cod. 80, p. 182; see also Heliodorus *Ethiopian Story* 2.32. For the presence of Axumite pottery at Berenike in the Late Period (fourth-sixth centuries CE) see Tomber (2007b): 175–182.

demonstrably the case with wine, where there is little reason to doubt its popularity in India. In addition, the scattering of red coral finds, while hardly abundant, certainly does not contradict the literary testimony. However, there are a few instances where the absence of one type of evidence leaves us dependent upon another. This is apparent with regard to textiles, slaves, animals, and plant and mineral compounds, where the literary testimony is quite important. It is true that textile fragments and archaeobotanical remains from Myos Hormos and Berenike can provide useful information. Nevertheless, as it currently stands, we would not be able to fully appreciate the variety and quality of textiles, unguents, dyes, and drugs exported from the Roman Empire, were it not for the testimony of the *Periplus*.

There is a general tendency to accept the literary testimony even in the absence of corroborating archaeological evidence. This is quite reasonable, especially in the case of organic products, where, due to their nature, they tend not to survive very well. Also, unless there are specific reasons to be sceptical of the literary testimony, it is usually best accepted. More troubling, however, are the occasional attempts to explain away the presence of certain Roman crafted wares, particularly in India, when the literary sources are silent. This can be seen from Stern's argument that the limited number of Roman glass wares in India corroborates the silence of the *Periplus*, or Dhavalikar's suggestion that the alabaster Eros at Junnar was a souvenir or the possession of a Yavana.[185] This desire to explain away their presence may in part relate to the modest (but often widespread) number of finds, as well as the longstanding and persistent assumption that Indians lacked a desire for Roman products and merely wanted gold and silver.[186]

Such attempts to dismiss the presence of Roman crafted wares should be resisted. It has, in fact, been shown that metalware, stoneware, and glassware were distributed across the Indian subcontinent. In many cases, these items are found quite far inland. Their locations almost certainly reflect local riverine and land-based transport networks and demand by the local population.[187] The fact that these crafted wares are often found in small numbers should not be taken as a sure indicator of their limited significance. Suresh has noted that inconsistencies in the conduct of earlier archaeological excavations in India, as well as the haphazard nature of publication, make studying this material

185 Stern (1991): 119–122; Dhavalikar (1992): 325–327.

186 Warmington (1928): 271–318. See also Miller (1969): 216–222; Raschke (1978): 672–673; Casson (1989): 30–31; P. Gupta (1991): 125.

187 For internal Indian transport networks see H. Ray (1991): 60; H. Ray (1996a): 4; H. Ray (1996b): 354–355; H. Ray (2010): 9–10.

problematic. In addition, it certainly hinders attempts to estimate the volume in which certain goods were reaching particular regions.[188] The archaeological evidence allows us to appreciate the extent to which such crafted wares were prized across the Indian subcontinent (if not the quantities in which they were demanded).[189] Indeed, the copying or imitation of many Roman objects should belie the notion that these crafted wares were insignificant or merely the personal possessions of Roman merchants.[190]

If one were to compare imports with exports, it would appear that the Roman Empire offered a greater variety of crafted wares than it received in turn. In fact, while there are many finds of Roman metal and glassware in India, few identifiable Indian crafted objects have been found in the Empire thus far. As mentioned in Chapter 6, the most notable of these is the ivory statuette found at Pompeii. Taken all together, the written and archaeological evidence demonstrates the great variety of products exported from the Roman Empire. It is striking that many of these items were refined, processed, or crafted in various ways that greatly added to their value, such as high-quality glassware, finely crafted gold and silver vessels and jewellery, and possibly even reworked silks. The often repeated notions that the trade was one-sided and that Rome suffered a "deficit" with India are in need of serious revision.[191]

Roman Coins in India

Coins (along with pottery) are more prevalent than any other type of Roman object discovered in India. The greatest number of these has survived in buried hoards, although surface finds and excavated coins also occur.[192] The reason for discussing these coins in a separate section is not to imply that they formed a separate or distinct component of the trade; rather, it is because their interpretation has been heavily contested among scholars.

The main areas of contention are the dates when these coins were exported and the question of whether they were continuously or sporadically shipped to India. One such theory asserts that wealthy Italian financiers and merchants were primarily responsible for the export of *denarii* in the Julio-Claudian peri-

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188 Suresh (2004): 21.

189 Cobb (2015a): 197.

190 For a discussion of these imitation see Suresh (2004); and de Saxcé (2015a). See also Tomber (2008): 123–124, 128–129, 132, 137–138.

191 See Chapter 8.

192 Suresh (2004): 160–177.

od, which is assumed to be a high point for the consumption of Eastern goods in the Roman Empire.[193] Coupled with this is the suggestion that after the Julio-Claudian period there was a shift in demand from high-value goods, like gems, to comparatively cheap and bulky products, like cotton.[194] In contrast, MacDowall argues that that the export of Julio-Claudian *denarii* and *aurei* took place as a result of currency reforms at specific points in the reigns of Nero (64 CE) and Trajan (107 CE). He notes that older Republican and Julio-Claudian coins became more attractive to export due to Nero's reduction in the weight and purity of the *denarius* and the weight of the *aureus*—these older coins had a higher precious metal content compared to post-64 CE coins, though they notionally had the same value within the Roman Empire. He believes this process was further exacerbated by Trajan's desire to remove old coins from circulation.[195]

In contrast to both these theories, it is argued here that there is no evidence to link Italian merchants exclusively with the export of *denarii*; nor does the evidence suggest that the Julio-Claudian period saw a peak in Roman involvement in the trade. Roman coins appear to have been exported continuously throughout the Principate. However, certain patterns can be discerned from a number of hoards containing *aurei*. These hoards, referred to subsequently as "batch pattern hoards", would suggest a major outflow of *aurei* during the mid to late first century CE, continuing into the early to mid-second century CE. It is fully acknowledged, however, that this position is tentative, given the difficulties inherent in interpreting the state of ware of these coins.

Regional Variations and Methodological Issues

The reason for focusing on Roman coins discovered in India is their comparative absence in the southern Arabian Peninsula and East Africa.[196] The extent to which this represents a genuine lack of exchange in these latter regions or simply the vagaries of discovery is difficult to say. As noted, Strabo implies that Arabia did receive gold and silver from Roman merchants, although there

193 Tchernia (1997b): 238–249 (Italian merchants); Sewell (1904): 593–594, 599–601; De Romanis (1997a): 80–160 (trade at its peak). See also Falk (2015): 109; Mathew (2015): 21–22.

194 Sewell (1904): 593, 599, 601; Banerjee (1921); Suresh (2004).

195 MacDowall (1991): 145–153; MacDowall (1996): 81–92; similarly Burnett (1998): 184–185 agrees that most of the Julio-Claudian coins were exported from the late first century CE; see also Howgego (1995): 104; and Turner (1989): 26–27; and Duncan-Jones (1994): 194–197. See also Nappo (2017): 573, who offers qualified support for this view.

196 Few Ptolemaic and Roman coins have appeared in East Africa and there is uncertainty whether those that have form part of modern collections—Horton (1996): 447–448.

is ambiguity as to whether this was in the form of coinage. Alternatively, S. Gupta has suggested that Arabian frankincense was paid for by Roman merchants reselling Indian goods rather than using precious currency—a possibility, although one that is extremely difficult to prove in the absence of any explicit literary testimony.[197] In fact, Pliny's statement that those who traded in incense and perfumes went to the port of Muza and no further may partially undermine this theory.[198]

The author of the *Periplus* does mention the export of coins, usually referred to as *denarion*, *khrēma* or *khrēmata*. In some instances, they are specifically referred to as being of gold and silver. These coins are said to be in demand in East Africa and southern Arabia, albeit in smaller quantities. This includes coins sent to the Barbaroi. It is stated that these were used by resident merchants so it is possible that they were brought back once the merchants departed. This could also have been the case at Malao.[199] The port of Muza accepted coins in a limited amount, although they are not explicitly described as Roman. In the Indian subcontinent the ports of the Barbarikon, Barygaza, Muziris, and Bakare are all described as accepting coins, the latter in significant quantities.[200] The literary evidence may suggest, rather weakly, that the disparity in finds reflects a real difference in volume of coin exports to different regions. At the same time, it underscores the point that India was not unique in receiving gold and silver coins.

The number of excavations conducted in India also affects the availability of evidence. Unfortunately, many Roman coins discovered in India, particularly before the mid-twentieth century, have been lost, stolen, or redistributed to collectors and museums without sufficient record. This has compelled scholars to rely on written accounts and published photographs. Earlier excavators did not always pay regard to stratigraphy in their excavations, a problem which predominantly affects coins found as individual specimens in layers rather than those in buried hoards.[201] These factors clearly impact upon any interpretations of the evidence, but it would be a mistake to dismiss clear and distinct patterns where they emerge.

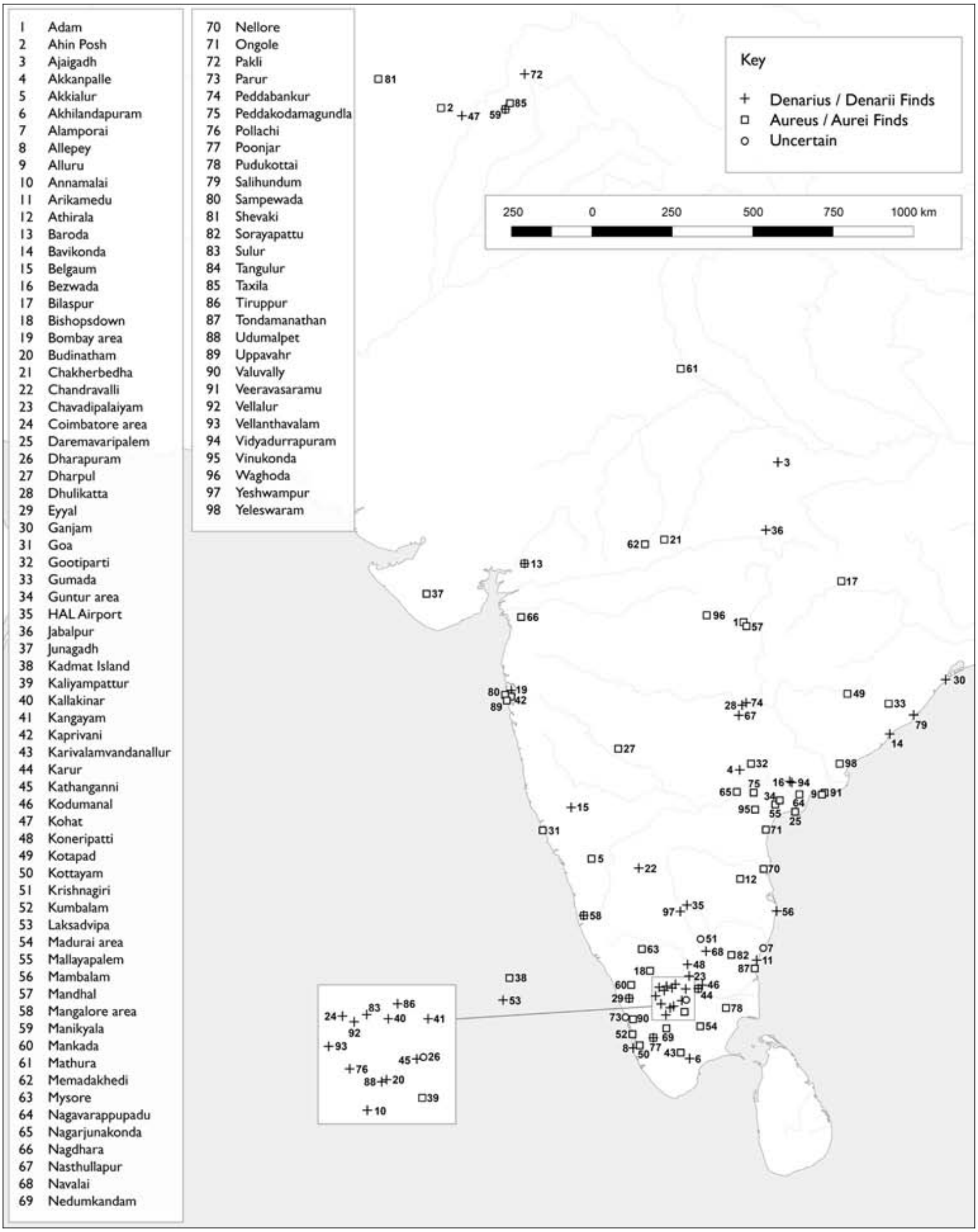
197 S. Gupta (2007): 112–121.

198 Pliny *NH* 6.26.104.

199 *Periplus* 6.2.32, 8.3.28–29; Casson (1989): 112, 122.

200 *Periplus* 24, 39, 49, 56.

201 Dhavalikar (1975): 330.



MAP 8 *The distribution of Roman* denarii *and* aurei *in India*

Find Spots

Around 130–140 reported discoveries (hoards, excavations, stray finds) of Roman *aurei* and *denarii* have been recorded at about 100 or so sites across the Indian subcontinent, though mostly in the peninsula.[202] Two regions, in particular, show major concentrations. The first is the wider Coimbatore district (southern India), where hoards of predominantly Julio-Claudian *denarii* have been discovered; this is the area in which the boundaries of the Chera, Pandya, and Cola kingdoms met. The second concentration is around the Krishna River in Andhra Pradesh (eastern-Central India); these finds consist predominantly of post-Julio-Claudian *aurei*.[203] There is a notable lack of Roman coins reaching Sri Lanka during the Principate. A few early Roman bronze coins have been found, but the vast majority date to the Late Antique period. A group of eight Republican *denarii* and another fourteen Principate-era *denarii* have also been discovered in Sri Lanka.[204] The dearth of earlier Roman coins and the abundance of later ones accords with the overall chronological pattern of Mediterranean-Sri Lankan trade links.

One explanation for the predominance of Julio-Claudian *denarii* in the Coimbatore region is the importance of overland routes linking the Malabar and Coromandel coasts. There were also beryl mines in this area, as well as cardamom and pepper plantations. These coins were potentially useful for large-scale transactions between local merchants and suppliers. The Roman coin finds near the Krishna River show a wider distribution than the Coimbatore finds. Suresh has argued that this reflects a shift of attention by Roman merchants towards the eastern coast of India by the second century CE.[205] However, it should not be assumed that the geographic distribution of these hoards reflects the movement of Roman merchants. The appearance of these coins at inland sites almost certainly points to internal trade networks. It may

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202 Variations in the detail and quality of reporting leaves a fair deal of uncertainty. See Map 8 for a distribution of known or purported finds of *aurei* and *denarii*, based on Turner (1989) and Suresh (2004).

203 Turner (1989): 5; Suresh (2004): 26, 31; Majumdar (2015): 420–421. Gurukkal (2016): 47, puts the number of hoards at c. 80.

204 Bopearachchi (1996): 68–70; Weerakkody (1996): 153; Bopearachchi, Disanayaka, and Perera (2016): 415.

205 Turner (1989): 5; Rajan (1996): 98, 103; Tchernia (1997b): 266; Suresh (2004): 31. Nappo (2017): 569, suggests that the Augustan and Tiberian coin finds from the Coimbatore region may have been hoarded for some very specific unknown reason, whereas in many other parts of India they may have been melted down. We should therefore be cautious about inferring too much from this concentration of coins.

be that silver and gold coins were used to acquire precious stones, spices, and cotton at the coastal emporia, but this certainly does not mean that Romans or other foreign merchants were transporting these coins inland.

The Julio-Claudian *denarii* found in Andhra Pradesh are less numerous than those found in Coimbatore. Some are stray surface finds, such as the single Tiberian *denarius* found at Vidyadurrapuram. Others have been recovered from stratified layers and hoards, including a hoard of eleven Tiberian *denarii* at Salihundam, and five Tiberian *denarii* found in an excavation in Totlakonda. There are, however, two important exceptions to the general pattern of *denarii* finds in Andhra Pradesh. The first and most important is the major coin hoard discovered at Akkanpalle, which consists of just over 1,500 *denarii* (a small percentage are imitations of Roman coins). This particular hoard represents around a fourth of all Roman *denarii* discovered in India. The second hoard was found at Nasthullapur and contains 39 *denarii*—not comparable to the Akkanpalle find, but still more numerous than the remaining *denarii* finds from Andhra Pradesh. The next highest hoard is Salihundam, with 11 *denarii*.[206]

The large finds at Akkanalle and Nasthullapur appear to be anomalous to the general pattern of *denarii* finds in Andhra Pradesh, because they are much further inland than the other sites. Also, both these hoards were in the vicinity of the Buddhist temple complexes at Amaravati and Nagarjunakonda.[207] There are several possible explanations for the presence of these coins. In many Indian kingdoms at this date, Buddhist monasteries were frequently given donations of money by political elites, with the intention that they be lent out at interest to maintain the monasteries and support the monks. The effect was to make these institutions similar to banks. These monasteries often had links with guilds and traders involved in interregional and international commerce, a situation that was aided by the fact that the ethical teachings of Buddhism were favourable to merchants.[208]

The northwest Indian subcontinent has revealed relatively few Roman coin finds. Interestingly, earlier Graeco-Bactrian and Indo-Greek coins seem to have remained in circulation in Afghanistan, Pakistan, and northwest India for some time. Greek coins, mostly of Apollodotus, have been found in Gujarat, as well as hoards of Nahapana coins mixed with Indo-Greek silver. This seems to confirm the statement in the *Periplus* that old Greek coins could still be found in the market places of Manbanos' realm (King Nahapana of the Western Kshatra-

206 Suresh (2004): 160–177; Turner (1989): 6, 45–91.
207 Turner (1989): 43–44, 119.
208 Kulke and Rothermund (1986): 93, 99, 102; Morrison (1997): 95; Thapar (1978): 64.

pas).[209] Nevertheless, Roman coins are not entirely absent. Surface finds of five *aurei* of Antoninus Pius have been found in Manikyala (near Rewat, Pakistan), as has a buried *aureus* of Tiberius in a grave at Tillya Tepe (Afghanistan).[210] *Aurei* of Domitian, Trajan, Hadrian, and Antoninus Pius have also been found at Jalalabad (Afghanistan), alongside Kushan coins.[211]

It has often been assumed that more Roman coins were exported to the northwest than is reflected in the hoards so far discovered. A major reason for this is that the author of the *Periplus* claims it was possible to exchange Roman gold and silver money for local currency at a profit in the port of Barygaza.[212] One theory proposes to explain this relative absence by suggesting that Roman coins were melted down by Kushan rulers, who then restruck their own gold coins at the same weight.[213] It has been argued that this was possible at least in the Barbarikon, because the king had a monopoly on the goods imported into the area. Consequently, Roman coins did not enter the open market, but were collected for melting down.[214]

The problem with this theory is that gold coins seem to have become more important in the Kushan Empire in the third century CE—a period post-dating the main peak of Roman coins exports (see below). In addition, Falk suggests that the similarity between Roman and Kushan coins has more to do with emulation (for example, copying the title 'son of god') than commerce.[215] Moreover, isotope analysis seems to suggest that Roman and Kushan gold coins used different sources for their metal, although this does not preclude the possibility that attempts were made to remove foreign Roman coins from circulation.[216] A similar theory has been proposed to explain the relative absence of *denarii* in central-western India by attributing their melting down to Nahapana and his Kshatrapa successors (who issued silver coins of at least 96 per cent purity).[217]

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209 *Periplus* 47; Turner and Cribb (1996): 309–312; *contra* Fussman (1997): 67–68.

210 Suresh (2004): 48, 176 (Manikyala); Sarianidi (1985): 241; Schiltz (2011): 226 (Tillya Tepe).

211 S. Ray (1991): 139; Singh (1988): 113.

212 *Periplus* 49.16.23–24.

213 Thorley (1979): 185; Singh (1988): 100; MacDowall (1991): 151; Cimino (1994): 138; Suresh (1992): 26; Suresh (2004): 35. The gold standard adopted by Vima Kadphises has no antecedents in India or the Near East but is in line with gold standard in Rome from the Augustan period—Falk (2015): 106.

214 J. Meyer (2007): 64.

215 Scheidel (2008): 269–270; Falk (2015): 107.

216 Falk (2015): 107, 109.

217 MacDowall and Wilson (1970): 221–240; MacDowall (1991): 145–146 (states 91–95 % purity); Turner and Cribb (1996): 312–313 (minimum 96 % of purity of 33 coins examined on basis of X-ray fluorescence, average purity 98.16 %). Gurukkal (2016): 49, asserts that silver only

Ultimately, however, it is difficult to postulate how effective any attempts by the Kushan and Ksatrapa rulers would have been in removing Roman coins from circulation.

Besides the notion of melting down Roman coins, a number of other theories have been proposed to explain their limited presence in northern India. One earlier theory held that there was simply less demand for goods from this region in the Roman Empire.[218] A further theory suggests that Roman coins merely passed through Kushan territory, which acted as a transit route for Sino-Roman trade rather than a terminus, like southern India. It is also suggested that the balance of payment may not have been in favour of the Kushans.[219] It is difficult to substantiate the latter two theories. In any case, the literary and archaeological evidence, as discussed above, demonstrates that Roman goods were widely appreciated in the northwest. Nevertheless, it may be that fewer finds of Roman coins appear in the northwest because there were stronger trading connections with southern India, as seen with the predominance of South Indian coarse wares at the Red Sea ports.

Roman Coin Numbers in India

The problems surrounding the record and preservation of Roman coin finds in India over the last few centuries mean it is not always possible to be precise about numbers and types. Nevertheless, a reasonable estimate puts the number of *denarii* discovered in India at roughly 5,000 to 6,000, and *aurei* at roughly 1,000 to 1,500 (if the Kottayam and Parur hoards are included, then perhaps around 10,500 *aurei*).[220] The most notable of the hoards was found in 1847 at Kottayam. It was discovered in a bronze vessel (possibly alongside coins in bags and buried in the soil) on the slope of a hill by the coast, and is said to have contained gold *aurei* with very few exceptions. Apparently, it was the equivalent of no less than 'five cooly-loads', which Turner equates to roughly 8,000 *aurei*.[221] These coins have all but disappeared.

become available with the arrival of Graeco-Roman traders on the western coast of India. For a more sceptical view see Majumdar (2015): 409–410.

218 Sidebotham (1986): 28.

219 S. Ray (1991): 140.

220 Turner (1989): 23; Tchernia (1995a): 154; Tchernia (1995b): 1003; Tchernia (1997b): 264; Whittaker (2004): 21; Tomber (2009): 42; Nappo (2017): 568. De Romanis (2012a): 167, puts the number of *denarii* and *aurei* in India at 5,728 and 1,243 respectively.

221 Turner (1989): 8–9, 62, estimates that a 'cooly' (manual labourer) could reasonably carry 25 lb of gold; see also Suresh (1992): 11; Suresh (2004): 26, 170–171, who states the hoard probably contained thousands of *aurei*.

Looking at the distribution of *aurei* finds in India, it appears that the greatest number have been found in the south, particularly in Tamil Nadu, and are predominantly Julio-Claudian in date. *Aurei* minted in this period are also found in Andhra Pradesh—though they tend to be less numerous, sometimes of just one or two coins—as well as Ongole, Mallayapalm, and the Guntur area. These *aurei* occasionally appear alongside later post-Julio-Claudian *aurei*, though usually not in large numbers (if at all) when issues minted in the second century CE are present.[222] Exceptions to the pattern seen in Andhra Pradesh can be found in the hoards at Nandyal, where the Julio-Claudian *aurei* outnumber later issues, and at Nagavarappupadu, where over 50 Julio-Claudian *aurei* are found without later issues.[223] In Tamil Nadu, some of the sites with Julio-Claudian *aurei* contain later issues alongside them, though the former tend to outnumber the latter. This is the case at the Madurai hills, Kalyampattur, and Pudukkottai, though at Soriyapattu and Karivalamvandanallur this trend is reversed. Finds of post-Julio-Claudian *aurei* tend to be rare in the areas around Coimbatore, Erode and Salem, and the hoards generally contain fewer of them (in almost all cases around one to five). Issues of almost all the Julio-Claudian, Flavian, Nervan-Antonine, and early Severan emperors appear in India.[224]

The vast majority of the *denarii* found in the Indian subcontinent are Julio-Claudian and predate 64 CE. Exceptions include a very small number of post-64 CE *denarii*, which consist of a *denarius* of Vespasian found at Jabalpur (Madhya Pradesh), one of Hadrian from Pakli and another from the Laccadive Islands hoard, and about eight post-Neronian *denarii* now in the British Museum (in the Indian Office Collection).[225] In addition, small numbers of Republican *denarii* have been found, including two at Kallakinar (Tamil Nadu), and one stray surface find at Tiruppur (Tamil Nadu).[226] Occasionally hoards with larger numbers of Republican *denarii* have been discovered, such as the Lac-

222 Cobb (2015b): 407–416.

223 Suresh (2004): 160–177—Nadyal—2 Augustus, 17 Tiberius, 8 Claudius, 20 Nero, 1 Domitian, 1 Nerva, 2 Trajan, 2 Antoninus Pius; Ongole—2 Nero, 1 Hadrian; Peddakodam—3 Nero, 1 Hadrian, 1 Antoninus Pius; Nagavarappupadu—6 Augustus, 2 imitation Augustus, 21 Tiberius, 24 Claudius, 1 imitation Claudius, 3 Nero, 1 unidentified coin.

224 Suresh (2004): 31, 34, 160–177; Turner (1989): 11–12.

225 Suresh (2004): 35; Turner (1989): 21. This contrasts markedly with many hoards in the Roman Empire. For example Julio-Claudian *denarii* only account for 4.7% of the total *denarii* finds at Pompeii (2,445), while *aurei* only 9% for finds at Pompeii, Herculaneum and Oplontis (682)—De Romanis (2012a): 164–165.

226 Suresh (2004): 28, 161, 164.

cadive Islands hoard of 226 and a hoard at Pakli of eight. Both these hoards also contain later imperial issues.[227]

The appearance of these later issues might lead one to assume that Republican *denarii* (in circulation for a long time) were transported to India primarily from the first century CE onwards.[228] However, the possibility remains that a few Republican *denarii* were brought to India in the first century BCE. The Republican *denarii*, just like post-Constantine I coins, lack the slash marks that appear on a significant minority of first century CE coins.[229] Furthermore, Suresh notes that unworn specimens of Republican *denarii* have been found at Ajaigadh, Krishnagiri, and Tiruppur, though these are individual surface finds rather than finds within hoards.[230] Interestingly, although early Augustan *denarii* are not common in India, the Eyyal hoard contains a fair number of early issues dating as far back as 31 BCE.[231] Given the developing contacts between Alexandria and Italy in the first century BCE, it would have been possible for Alexandrian merchants to have acquired Republican and early Augustan *denarii*. Likewise, issues of Mark Antony also circulated in the Eastern Mediterranean for some time after his downfall.[232] It is not impossible that a number of Republican coins were brought to India earlier, circulated, and then incorporated into a hoard alongside later issues.

As mentioned, the majority of *denarii* found in India are Julio-Claudian. These predominantly consist of *denarii* minted under Augustus and Tiberius, with a notable amount of the *Gaius et Lucius Caesares* issues and the Pontifex Maximus issues of Tiberius (with a seated Livia).[233] The Gaius and Lucius issues were minted from 2 BCE and were still being struck at Lugdunum (Lyon) in at least 12 CE.[234] There are estimates that these account for 25 per cent of the Augustan *denarii* in India.[235] Some have argued that these particular issues were specifically selected for their purity and, furthermore, that the higher pro-

227 MacDowall (1996): 89.

228 Turner (1989): 42; MacDowall (1996): 89.

229 Berghaus (1991): 108.

230 Suresh (2004): 29.

231 See Singh (1988): 122–126; Turner (1989): 55–56.

232 For the circulation of *denarii* minted by Mark Antony in the Republican and Imperial periods see Crawford (1974): 94–102; Mattingly (1967): 179; Huzar (1978): 151.

233 Gaius and Lucius Caesars issues—RIC 2.207 ff.; Pontifex Maximus issues of Tiberius—RIC 2.25 ff.

234 Mattingly (1923): cxiv; Sutherland and Carson (1984): 97; Rose (1997): 20; Tchernia (1997b): 264.

235 Turner (1991): 21.

portion of these coins in Indian hoards compared to those found within the Empire suggests a process of selection.[236] It has even been theorised that these coins came directly from the mint, and that any merchant who wished to export them would have needed imperial permission.[237]

Several aspects of these theories can be critiqued. First of all, the Gaius and Lucius issues were struck in immense numbers over a fairly long period, and the Pontifex Maximus issues were minted uninterruptedly for over 20 years of Tiberius' reign.[238] It is not surprising that they were frequently acquired by merchants from the coins in circulation. Secondly, the absence of shared dies in most of the Roman coin finds in India undermines the idea that they normally came directly from the mint. These coins were probably selected as recognisable issues of good quality—ones that inspired sufficient confidence in those receiving them—meaning that they were willing to weigh batches of these coins rather than assay them (check their purity) individually.[239] This desire for confidence can be seen in an account by Cosmas (sixth century CE), who recalls how an associate, Sopatrus, impressed the king of Sri Lanka with the high-quality Byzantine coins (finely shaped, a good ring, bright metal) that he had brought with him.[240]

After selecting the right coins for export, there may have been a requirement to seal them in official bags by the time they reached Alexandria. The practice of sealing coins in bags (*marsippia*) is certainly mentioned in a few papyri from Egypt.[241] It is possible that this was the case with the *marsippia* recorded in some of the Berenike customs passes, although no explicit statement to this effect is made; nor is it beyond doubt that the bags contained coins.[242] That some of the Roman coins exported to India were sealed in bags could also be tentatively suggested from the details surrounding the Kottayam hoard (1847): alongside the main bronze vessel, it was reported, bags of coins had been buried in the soil. But since the circumstances of this discovery are far from detailed, it is best not to push this idea.

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236 Bolin (1958): 72–74; MacDowall (1991): 146–147; MacDowall (1996): 83; Burnett (1998): 181–182—but not with second century CE gold coins.

237 Bolin (1958): 72–74 (directly from the mint); Crawford cited in Tchernia (1997b): 264 (Imperial permission).

238 Mattingly (1923): lxxiii, cxiv; Sutherland and Carson (1984): 28; Suresh (1992): 17.

239 MacDowall (1991): 147–149; MacDowall (1996): 83, 89; De Romanis (2012a): 170.

240 Cosmas *Christian Topography* 11.338.

241 *P. Mert.* 3.113; *P. Oxy.* 2728; *P. Cair. Zen.* 59010.

242 Nappo and Zerbini (2011): 67–68; Nappo (2017).

As noted, Julio-Claudian *denarii* and *aurei* represent the majority of Principate-era coins discovered in India. There are approximately 1,400 coins of Augustus, 2,500 of Tiberius, 35 of Gaius (Caligula), 300 of Claudius and 200 of Nero.[243] This means that roughly two-thirds of the *aurei* and *denarii* found in India were minted in this period. The vastly greater numbers of Augustan and Tiberian coins may, in part, denote the greater total output from the mints under these emperors, a pattern also reflected in *denarii* finds from hoards in the Bay of Naples region.[244] Indeed, some hoards such as those at Kodumanal, Koneripatti, and Vellalur (1939) contain coins of solely Augustan or Tiberian date.[245] The greatest portion of the Julio-Claudian *aurei* was minted during the reigns of Tiberius and Claudius; for example, the Pudukkottai hoard in Tamil Nadu contained 42 Augustan *aurei* compared, to 168 of Tiberius and 156 of Claudius. This hoard also included fourteen of Gaius, 116 of Nero, and three of Vespasian.[246]

The degree to which factors in India and the Roman Empire affected the export of Roman coins is a matter of interpretation. The output of the imperial mints is likely to have impacted the composition of the coins exported to India, alongside market demand in India itself. The consistent output of Augustan and Tiberian *denarii* from the mint at Lugdunum no doubt explains their predominance in India. Conversely, the limited output of *denarii* and *aurei* during the short reign of Gaius is reflected in their limited presence in India. It is also important to note that the volume of coins minted was often affected by specific events (e.g. Claudius' invasion of Britain in 43 CE).[247] The lower percentage of silver coins after Tiberius may partially reflect the reduced silver output from the Lugdunum mint during the rest of the Julio-Claudian period.[248] *Aurei* increasingly formed a much higher proportion of the value of coins in circulation in the Empire, as seen at Pompeii.[249] Indeed, the output of gold increased dramatically in Nero's reign after 64 CE.[250] The correlation between these fac-

243 Sidebotham (1986): 27; Suresh (2004): 31, 160–177.

244 De Romanis (2012a): 168–169, 176, also suggests that the increase in *aurei* minted under Tiberius compared to Augustus reflects emissions of these coins within the Roman Empire.

245 Turner (1991): 16; Turner and Cribb (1996): 312; Suresh (2004): 162.

246 Suresh (2004): 163; Turner (1991): 16.

247 For the volume of minting see Sutherland (1951): 179–181; Sutherland and Carson (1984): 104, 116–117, 145.

248 Burnett (1998): 182; J. Meyer (2007): 60.

249 Lo Cascio (2008): 161–162.

250 See Duncan-Jones (1994): 120.

tors and the pattern of Roman coin finds in India is intriguing, and probably more than just a coincidence.

State of Wear of Roman Coins in India

A great deal of the debate about when Roman coins were exported to India has focused on the conditions in which they survive. A coin in good condition may indicate that it was exported relatively soon after being minted and did not circulate widely in India before its loss or burial in a hoard. In contrast, a worn coin usually indicates a degree of circulation prior to burial or loss.[251] Controversy arises from the extent to which worn coins circulated in the Roman Empire or in India prior to their final disposition. The value in determining the periods in which these coins were exported is that it may reflect broader patterns of trade. If the coins were exported soon after they were minted, this would imply a peak in the Julio-Claudian period. As noted above, it is on this basis that Tchernia argues that Italian merchants were heavily involved in the export of *denarii* in the first half of the first century CE.[252] In contrast, MacDowall suggests that most of the Roman coins found in India do not reflect general patterns of trade, but were exported as a result of the currency reforms of Nero (64 CE) and Trajan (107 CE).[253] However, as shall be demonstrated, these coins were being exported continuously, but the batch pattern hoards suggest a major phase of export in the latter first century CE.

Burnett has argued that Roman coins cannot be used as indices of trade, asserting that the process of selecting particular coins meant that they arrived in India as large shipments in a confined period of time, rather than as continuous items of export.[254] However, this argument is based mostly on the frequency of the Gaius and Lucius and Pontifex Maximus issues, which, as has been shown, were heavily minted and widely circulating coins. It has also been noted that the frequency of certain coins found in India correlates to some extent with the minting output of particular emperors. The author of the *Periplus* does not indicate that coins were regarded as unusual or distinct items of trade. Moreover, as De Romanis notes, Tiberius's purported complaint about the outflow of coins to foreign or hostile nations (22 CE) does not make sense if

251 This was, however, a practice in the Medieval period, see Goitein (1967): 237—TS 16.163, 1.21*.

252 Tchernia (1997b): 267–272; Tchernia (2016): 242–243. See also De Romanis (2012a): 167–179, for the primary export of pre-64 CE *denarii* and *aurei* from Italy to India.

253 MacDowall (1991): 145–153; MacDowall (1996): 81–92.

254 Burnett (1998): 185–187; see also H. Ray (1994): 51; J. Meyer (2007): 60–61.

it is assumed that most of them were exported as a result of currency reforms undertaken by Nero (64 CE) and Trajan (107 CE).[255]

There are many difficulties in assessing the state of wear of Roman coins in India. Only a limited number are available for physical examination, and very few photographs have been published. When written reports are available, they inevitably give the subjective (and sometimes imprecise) descriptions of the authors. A further problem arises from the different chemical compositions of gold and silver. Gold coins tend to be less susceptible to corrosion than silver, the latter being particularly vulnerable when buried in small numbers. This can affect the weight loss of these coins, as can subsequent cleaning. Turner has described how the large hoards of Akkanpalle and Budinatham *denarii* survived in lumps: while those on the outside became a congealed mass of silver sulphides, the coins on the inside remained uncorroded, for they were protected from the air.[256] Despite the challenges, there is still sufficient evidence that broad patterns can be interpreted from the data.

Many reports describe *denarii* surviving in relatively good and unworn conditions. The Pollachi, Karur, Kathanganni, and Bangalore (HAL Airport) hoards are variously described as having high weights and being bold and distinct. Physical examination of the Budinatham and Akhilandapuram *denarii* by Turner confirms the written reports about their well-preserved state.[257] Exceptions to this picture come from the Akkanpalle and Nasthullapur hoards, where the state of the coins is more diverse and there are high numbers of worn coins. One possible explanation for this is that the hoards were buried at monastic sites that may have acted as banking centres, opening the possibility that some of these coins circulated in India for a period of time.[258]

The relatively good condition of the *denarii* suggests that they were exported to India not long after they were minted—presumably largely within the first century CE. Sutherland and Carson suggest that silver coins might reasonably remain in circulation for about 50 years, though others suggest longer.[259] This can only be a rule of thumb, since Gresham's law likely drove heavier and purer-quality coins out of circulation at a faster rate.[260] With regard to gold coins, it

255 De Romanis (2012a): 171; Tac. *Ann.* 3.53.

256 Turner (1989): 14–15; Howgego (2009): 291.

257 Turner (1989): 15–16—see Plate V pages 136–137.

258 Kulke and Rothermund (1986): 93, 99, 102; Morrison (1997): 95; Thapar (1978): 64; Turner (1989): 15, 43, 120.

259 Sutherland and Carson (1984): 10; *contra* MacDowall (1996): 82; Duncan-Jones (1994): 181, 191, 205, 210.

260 For effects of Gresham's Law see Duncan-Jones (1994): 102.

has been argued that they were used less regularly in transactions and therefore had a longer lifespan (though they were certainly important for long-distance commerce).[261] These theories, of course, apply to the Roman Empire. It would be difficult to state the velocity of circulation for these coins in India.

In a few instances, there is no available information about the condition in which some coins survive. This is the case with the finds from Chavadipalaiyam, Kotapad, and Pennar.[262] There are also reports that describe the worn condition and reduced weight of some *denarii*. MacDowall notes that the Nasthullapur and Vellalur hoards have lower weight ranges than the Akkenapalle hoard (the latter is between 3.3 and 3.8 grammes in range), which are comparable to hoards buried during the Flavian period in the Roman Empire (such as Bucklersbury House and Mildenhall).[263] He also notes that in the Budinathan hoard, which mostly consists of Augustan and Tiberian *denarii* (369 Gaius and Lucius issues and 1029 Pontifex Maximus issues), one Augustan *denarius* is countermarked 'IMP VESP' ('Imperator Vespasianus').[264] Furthermore, among the 23 mostly Republican to Tiberian *denarii* of the Pakli hoard (which survived being dispersed unrecorded among private dealers), one coin of Hadrian is present.[265]

Based on these hoards MacDowall believes that many of the *denarii* must have been exported in the Flavian period and early second century CE, in line with his theory about the effect of the currency reforms of Nero and Trajan. However, these patterns are not broadly reflective of most *denarii* finds in India, which generally survive in good condition, including the Budinathan hoard. Most of the *denarii* probably did not circulate for extended periods of time within the Roman Empire prior to export. Besides, it cannot be taken for granted that all coins in the Pakli hoard were exported as a batch, rather than assembled in India. The possibility remains that the coins were acquired from different sources before being assembled together. This is quite probably the case with the Nesthullapur hoard, which reveals *denarii* with Indian punchmarks on them.

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261 Hopkins (2002): 227; Sutherland and Carson (1984): 10; *contra* Lo Cascio (2008): 164–166, 170—*aurei* did act as store of wealth, although they were still important in long-distance commerce.

262 Turner (1989): 15–16—also Coimbatore 1817 and 1912, Mambalam, Salihundam and Vidiyadurrapuram.

263 MacDowall (1996): 86—(Vellalur 3–3.6 g, some even less than 3 g); see also Turner (1989): 70–71—(Nasthullapur—Augustan *denarii* 3–3.8 g, Tiberian *denarii* 2.6–3.7 g).

264 MacDowall (1996): 87.

265 5 Republican consular coins, 1 Julius Caesar, 1 Mark Antony, 1 Brutus, 12 Augustus, 2 Tiberius, 1 Hadrian—See Singh (1988): 114.

In contrast to the *denarii*, Julio-Claudian *aurei* are frequently described as being in worn condition.[266] However, there are chronological variations in some hoards; for example, Turner notes that the Kaliyampattur hoard is reported to have contained worn Augustan to Claudian *aurei*, but less worn Neronian *aurei*, alongside coins of Domitian, which were in good condition. Similar patterns are also seen in the Pudukottai and Nandyal hoards, suggesting that earlier Julio-Claudian *aurei* were in circulation for longer before being buried with the later *aurei*.[267] This pattern also seems to be observable in hoards from Karivalamvandanallur, Nagavarappupadu, Tondamanathan, and Valuvally.[268] These are the batch pattern hoards (as is the Kumbalam hoard, although it only contains second century CE coins). The post-Julio-Claudian *aurei* are generally described as surviving in good condition, despite appearing in hoards with a wide chronological spread. Examples include Athirala and Vinukonda, where the descriptions of condition range from 'in fine condition' to 'beautiful' preservation.[269] This suggests that these post-Julio-Claudian *aurei* were exported soon after they were minted and did not circulate with great frequency in India. As mentioned, the post-Julio-Claudian *aurei* are much less numerous but there was a small increase in the number of Severan *aurei*. However, most of these coins are worn and have been found alongside late Roman coins, perhaps indicating that they were part of the Late Roman trade.[270]

Altogether, these batch pattern hoards (Kaliyampattur, Karivalamvandanallur, Kumbalam, Nandyal, Nagavarappupadu, Pudukottai, Tondamanathan, and Valuvally) represent about three-quarters of the *aurei* finds from India (excluding the Kottayam hoard and the unidentified *aurei* of the Parur hoard). The latest *aurei* that appear in these hoards range from issues of Nero to Marcus Aurelius. However, there is a particular peak during the second half of the first century CE. Four of the hoards were buried in or just after the late first century CE (first group), while the other four were buried in the second century CE (second group); but in terms of coin numbers, within these hoards, there

266 There are of course exceptions, as seen from the coins in hoards at the Madurai hills, Adam and Kottayam. However, in the case of Adam there is some debate. Suresh (2004): 74, 173 notes their fairly good state; *contra* MacDowall (1996): 91, who points to the average weight of these coins being 7.65 g; lower than the typical 7.85 g at which Tiberian *aurei* were usually struck.

267 Turner (1989): 15; also Suresh (1992): 18.

268 Suresh (2004): 74; Cobb (2015b): 407–416.

269 Turner (1989): 16.

270 Berghaus (1991): 110–111.

is a 3 to 2 ratio between the first and second group. In addition, 66 per cent of the identifiable coins from all aforementioned hoards are Julio-Claudian *aurei*, with only 2 per cent being issues minted by Flavian emperors, and 32 per cent by the Nervan-Antonines.[271]

It is not argued that these hoards represent original, untouched trade batches, especially since some of them contain only a small number of coins. Many of the coins in Pudukottai hoard reveal slash marks, and the Tondamanathan and Nagavarappupadu hoards were discovered with local coins alongside them. Nevertheless, the pattern displayed in these hoards is much easier to explain as a result of circulation within the Roman Empire rather than circulation within India. Only in a few areas, such as Akkanpalle and Nasthullapur, are Roman coins conjectured to have circulated as currency in India, and these theories are controversial. Furthermore, besides the Julio-Claudian *aurei*, which, it is argued, were exported mainly during the Flavian period and the early second century CE, most coins in India appear to be in good condition (notably the Julio-Claudian *denarii* and the second century CE *aurei*). A more haphazard pattern of the conditions of these coins might be expected if they were disparately assembled over a long period of time within India.[272]

The reported discovery at Kottayam (in 1847), which Turner suggests may have equated to 8,000 *aurei*, obviously has a major impact on any assessment of the main phase of Roman coins exports to India. A few descriptions of this hoard were published some time after its discovery, but these are not particularly comprehensive in detail, and most of the coins were subsequently dispersed in local markets. From the detail available, it appears that many of the coins survived in excellent condition, though a few were partly obliterated; it is not clear exactly to what this refers. Turner argues that this hoard was a Roman merchant's consignment rather than a hoard assembled in India, citing the fact that the coins were in excellent condition, that many were found in a bronze vessel, and that it was a bimetallic hoard (a few *denarii* are reported to have been included).[273] The latter two features are extremely unusual among most Roman coin hoards in India, lending Turner's theory a significant degree of plausibility.

There is some evidence of the hoard's composition, as a few individuals were able to examine a number of these coins before they were lost.[274] From

271 For a discussion of the specifics see Turner (1989): 58, 69–70, 74–77; Cobb (2015b): 415–416.

272 Cobb (2015b): 407–416.

273 Turner (1989): 9—some coins were possibly in bags subsequently lost; Suresh (2004), 26, 41, 75.

274 Several of the coins did make it to the Madras Museum, 80 to 90 went to the Rajah of Tra-

the surviving evidence, it is clear that the coins were almost exclusively Julio-Claudian (Augustus to Nero), bar one coin which Drury labelled an issue of Caracalla, though he initially believed it to be one of Antoninus Pius.[275] Turner is surely right to note that 'the inclusion of such an issue in an otherwise exclusively Julio-Claudian hoard is hard to explain.'[276] The two most plausible ways of interpreting Drury's comment is either that he was mistaken in his attribution, or he observed a coin or coins that were not part of the original discovery and had intruded into the part of the collection he was able to observe (he was not present at the initial discovery). It is very unlikely that thousands of unworn Julio-Claudian *aurei* were still obtainable during the reign of Caracalla.[277] Julio-Claudian *aurei*, if they actually appear in hoards alongside issues of Caracalla, do not exceed 13.5 per cent of the hoard and are highly worn.[278] Therefore, if Turner is right in classifying the Kottayam hoard as merchant's lost trade consignment, the coins must have been exported either during the reign of Nero or in the early Flavian period.

Roman Coinage as an Indicator of Trade Fluctuations

As already noted, one school of thought holds that the prevalence of Julio-Claudian *denarii* in India reflects a major peak in Roman trade with India during the early to mid-first century CE. Some have argued that Italian merchant families were heavily connected with this supposed peak in trade, and

vancore, and some were eventually donated to the Asiatic society of Bengal. A total of 71 coins are described in the reports, some overlapping the Travancore collection—Turner (1989): 62.

275 Drury (1852): 371–387.

276 Turner (1989): 62.

277 The operation of Gresham's Law means that most Julio-Claudian coins would have disappeared from circulation well before the reign of Caracalla—see MacDowall (1991): 145–146, and (1996): 86. Indeed, pre-Neronian *aurei* were recalled from circulation in 107 CE (Cass. Dio 68.15). In addition recycling by the Roman mints led to older issues disappearing—Carson (1990): 39; Ponting (2009), 276–277. The batch pattern hoards show that Julio-Claudian *aurei* are much less frequent in hoards which have issues of the second century CE.

278 Julio-Claudian *aurei* only appear alongside issues of Caracalla at Sorayapattu (193 *aurei*, 3 of which are Tiberian, 5 Claudian, 18 Neronian) and Vinukonda (15 *aurei* of which 2 are Tiberian): As can be seen from hoards buried in the second century CE that do contain some Julio-Claudian *aurei*, the earlier the emperor the lower the number, e.g. the Sorayapattu hoard. Suresh (2004): 160–177; also Duncan-Jones (1994): 115, 195–196, notes that due to wastage older coins tend to be less numerous in hoards.

were particularly responsible for their export.[279] It has further been noted that some scholars assumed that most of these unworn Julio-Claudian *denarii* came directly from the mint at Lugdunum. Furthermore, Tchernia posits that since *denarii* did not circulate in Egypt, their export must relate to the involvement of Italian merchants in the Indian Ocean trade. It is claimed that the export of these *denarii* began under Augustus, and that this process was behind Tiberius' purported complaint that the wealth of the Empire was being drained to the East for the sake of women's finery. He also states that some *denarii* may have been exported after Nero's currency reforms, but this would have ceased once Trajan removed the older coins from circulation.[280]

These theories are, however, in need of qualification. With regard to Egypt's currency, it is true that it minted its own distinct coins up till the reign of Diocletian (although *aurei* were occasionally minted at Alexandria).[281] Nevertheless, the notion of Egypt having a closed currency system has been challenged, not least due to the fact that effective credit transfer agreements existed.[282] As noted in Chapter 3, there is certainly evidence for the involvement of Italian merchants, but they were by no means the exclusive or even predominant group involved. There were strong trading connections between the port of Alexandria and Puteoli (and later Ostia) in both the late Republican and Imperial periods, and, judging from the archive of the Sulpicii, Greek or at least Hellenised merchants were very prominent in this commerce.[283] Large numbers of *aurei* and *denarii* may have derived from Italy, but this should probably be seen more in the context of commercial engagement between Italian and other merchants groups connected with Alexandria, rather than purely as the prerogative of the former.[284]

De Romanis argues from the literary sources that the Julio-Claudian period was one of excessive spending by the elite on high-value status items, including those goods acquired from the Indian Ocean trade. In particular, he cites Tacitus' statement that many of the '[o]ld rich families, noble and illustrious, were

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279 P. Gupta (1991): 129; Tchernia (1997a): 238–249; Tchernia (1997b): 250–283 (export of *denarii*); De Romanis (1997a): 119–128 (Julio-Claudian peak in trade).

280 Tchernia (1995b): 1004–1006; Cass. Dio 68.15.

281 Bland (1996): 113; Carson (1990): 25.

282 Bowman (2010): 106.

283 For the archive of the Sulpicii see D. Jones (2006); McLaughlin (2010): 157, 171, also notes that the shipment of grain from Alexandria to Italy generated profit for these merchants. Presumably it also meant that large quantities of *denarii* and *aurei* could be brought back to Alexandria.

284 De Romanis (2012a).

often ruined by a passion for magnificence', but Vespasian ushered in a new age of moderation, with many of the newer senatorial families emulating him.[285] De Romanis is undoubtedly correct to note that elite expenditure on Indian Ocean goods was very high in the Julio-Claudian period, but this was true of the Flavian period as well. Tacitus' claim should be seen in the context of the fact that these "new men" from Italy had been penetrating the elite much earlier than this period.[286] It should also be borne in mind that Tacitus' comments were part of a common literary theme that condemned profligacy and lavish spending, and may be seen as part of an exaggerated desire to praise Vespasian and condemn Nero. The notion of "a declining elite" also found expression in the Flavian period and the early second century CE. Notably, Juvenal jokes that with great fortunes being spent on banquets such people will surely disappear, and that people are living pretentious lifestyles on borrowed money.[287] Indeed, the poetry of Martial and Statius does not imply a decline in the desire for high-value goods among the wealthy and elite.

It is also important to bear in mind that although the great bulk of the *denarii* were exported during the Julio-Claudian and early Flavian period (outnumbering the *aurei* by approximately 4:1, if the Kottayam and Parur hoards are excluded), the value of the *aureus* greatly exceeds that of the *denarius*. Its weight is also double that of a *denarius*.[288] In the Roman Empire, one *aureus* was worth 25 *denarii*. There is no doubt that gold was also of significantly higher value than silver in various Indian polities of the Early Historic period.[289] Lebedeva makes a comparable point, but she supposes that *aurei* were exported soon after being minted, and therefore argues that the reign of Claudius repre-

285 Tac. *Ann*. 3.55—trans. from De Romanis (1997a): 119–128; see also Suet. *Vesp*. 9.2; and also Wallace-Hadrill (2008): 332, who notes that the emperors may have felt it beneficial to allow the elite to self-destruct through competitive spending.

286 Wallace-Hadrill (2008): 333.

287 Juvenal 1.135–140 (fortunes on banquets), 3.180–183 (money borrowed for lavishness).

288 The *denarius* weighed 3.9 g from the reign of Augustus, and it had been reduced to 3.4 g after 64 CE. The *aureus* weighed just over 8 g prior to the 64 CE reform. However, as most of the Julio-Claudian *aurei* in Indian hoards are worn to some degree their weight tends to be between 7–8 g. Post-64 CE the weight was reduced to 7.3 g. By the time of Caracalla it had reached 6.5 g; see Carson (1990): 14, 31–32. See also Cobb (2015b): 388–389; and De Romanis (2012a): 175, who notes that of the total face value of pre-64 CE coins, *denarii* represent 22 % and *aurei* 78 % of this value.

289 The value ratio between gold and silver in India fluctuated in different period over different regions—see MacDowall (1996): 92, who notes that the ratio of gold to silver in western India was 1:10. Bernstein (2008): 42, arguing mostly from medieval evidence, notes the relatively higher value of silver in India and China.

sented the most significant phase of Roman trade with India.[290] However, from the evidence of the batch pattern hoards, it seems that most Julio-Claudian *aurei* were being exported in the Flavian period and the first part of the second century CE. The *denarii* finds in India suggest that these coins largely arrived in India throughout the first century CE. It has also been suggested that the Kottayam hoard was a trade batch from the reign of Nero or the early Flavian period.

Even if the Kottayam hoard is dismissed as a fluke discovery or a statistical anomaly, the batch pattern hoards still indicate that the greatest peak of *aurei* exports was during the second half of the first century CE. This broadly accords with the archaeological evidence that will be examined in Chapter 9. Therefore, it seems that there was a trade peak during the first century CE, particularly the second half, followed by a decline during the course of the second century CE. The local Egyptian coin finds at Berenike also reflect this pattern, showing a very heavy concentration of Augustan and first century CE coins (especially from Claudius to the Flavians) and a marked drop in the number of second and third century CE coins. Furthermore, it is also clear that a great deal of investment in the fortlets of the Eastern Desert took place during the Flavian period and early second century CE, precisely at the time when the greatest value of coinage was being exported.

The Impact of Nero's Currency Reform (64 CE)

Nero's currency reform in 64 CE was probably the primary cause of the near complete absence of post-Julio-Claudian *denarii* found in India. Both the *aureus* and the *denarius* were affected by this reform, the latter to a greater extent. Pliny states that *aurei* had previously been struck at 40 to the pound of gold, but Nero reduced their weight to 45 to the pound.[291] However, from coin finds in the Roman Empire it appears that by the reign of Nero (pre-64 CE) the *aureus* was actually around 43 to the pound of gold, and was then (less dramatically) reduced to 45 to the pound after the reforms (a 4.5 per cent reduction). The *denarius* was reduced from 86 to 89 to the pound in the early reign of Nero, to then be reduced to 96 to the pound (an 11 per cent reduction) after his reforms.[292] Sutherland and Carson argue that earlier small reductions in weight are likely to have been the result of new emperors keeping the precious metal content of their coins in line with that of their predecessors (whose coins

290 Lebedeva (1988): 51–52.

291 Pliny *NH* 33.13.47.

292 Carson (1990): 4–5, 14, 228–231; Duncan-Jones (1994): 217–223.

were slightly worn through circulation). In this way, they would have prevented Gresham's law, for otherwise the newly minted coins may have begun to be hoarded. The purity of the *denarius* was also reduced from its average of 97.35 per cent (pre-reform) to 93.5 per cent (post-reform), though recent analysis by Ponting suggests that it might have fluctuated between 80 and 90 per cent.[293] Turner suggests that the Indians grew mistrustful and unwilling to accept post-64 CE *denarii*, but they were still willing to accept later *aurei*, as they had been reduced only in weight and not in purity.[294] Indian merchants did have the means available to test the purity of coins by use of the touchstone, a process also described by Pliny:[295]

> When experts using this touchstone, like a file, have taken scrapings from an ore, they can say at once how much gold it contains and how much silver or copper, to a difference of a scruple, their marvellous calculation not leading them astray.[296]

The following question then arises: if these coins could be so accurately assayed, why did Indian merchants not simply take post-64 CE *denarii* and adjust their prices by demanding more of them to make up the difference? Part of the answer may be, as MacDowall notes, that Indian traders were unwilling to weigh and assay each individual coin, and would have sought out issues they knew to be of a particular weight and purity.[297] The desire to avoid this tedious and time-consuming process led, in some periods and locations, to coins being assessed and sealed (as was possibly the case with the previously discussed *marsippia*).[298] In addition, the choices of Roman merchants would certainly have affected the coins exported. One of the main reasons would have been that while post-64 CE *denarii* would have maintained the same nominal value within the Empire, their reduced silver content would have made them less profitable to trade in India. This is Gresham's Law in reverse, since instead of holding on to the coins with a higher silver content, the merchants desired

293 Sutherland and Carson (1984): 4–5, 134; Carson (1990): 224; Ponting (2009): 269–275.

294 Turner (1991): 26.

295 For use of touchstones by Indians see the *Buddhaghasa*—Tchernia (1995b): 1004.

296 Pliny *NH* 33.43.126—trans. from Rackham (1952).

297 MacDowall (1991): 149; MacDowall (1996): 89.

298 See also the evidence from Aï Khanum where the amphora of Cosmos containing legal silver currency was checked and sealed by Nikeratos. It has been suggested that this was to stop it mingling with lower purity Indian coins—P. Bernard (2011): 109; see also later Fatimid practices of sealing money in purses—Goitein (1967): 231.

to exchange them in India because they were being treated primarily as bullion.[299] Indeed, MacDowall has connected the statement in the *Periplus* about the exchange of Roman gold and silver coins at Barygaza for a profit to the fact that the ratio for gold to silver bullion was 1 to 12 before the 64 CE reform. This compares to the 1 to 10 value held in the region of western India, thus making silver profitable to export.[300] As a result, it was less profitable to export post-Julio-Claudian *denarii* to India. Julio-Claudian *denarii* would have continued to be exported while it was reasonably easy to acquire them from those in circulation, but this would have become increasingly more challenging by the end of the first and the beginning of the second century CE.

Summary: Coinage

The theory that Roman coins were not used as a normal item of trade in the Indian Ocean but were only exported in a limited period, due to specific events within the Roman Empire, does not seem supportable from the evidence. In fact, it is quite clear that they were a regular item of trade, and were reaching India prior to 64 CE. On the basis of the batch pattern hoards, it is argued here that the mid to late first century CE represented a peak period for the export of Roman coins to India (at least in terms of value).

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299 Tchernia (1997b): 266.

300 MacDowall (1996): 92; *Periplus* 49. The fact that the *denarius* and *aureus* were both reduced in weight indicates that these heavier coins were becoming more valued as bullion than currency—Carson (1990): 230; see also Howgego (1992): 12.

CHAPTER 8

Rome's Trade Balance with India

> … and we lose those monies only which are made of the over-balance of our general trade, that is to say, that which we spend more in value in foreign wares, than we utter of our own commodities.
>
> THOMAS MUN *England's Treasure by Foreign Trade* (1664)[1]

∵

Thomas Mun, in trying to convince his contemporaries that the export of bullion could be of benefit to England, summarises the contemporary prejudices against this practice in the early modern period. Commonly known as mercantilism, this notion is most closely associated with the sixteenth to eighteenth centuries. Its basic premise is that a state should try to retain as much money within its borders as possible, while ensuring a net export of goods in order that gold and silver might flow into the country.[2] Huet, Cantillon, and Montesquieu all discussed Roman trade with India inside this framework.[3] This notion would be subsequently challenged by theories about free market economics, as advocated by proponents such as Adam Smith.[4]

Despite the decline in support for mercantilist ideas about exchange, it is striking that many scholars of the twentieth century examined Rome's trade with India in this conceptual framework. Even as late as the mid-twentieth century Miller claimed that Pliny expressed a mercantilist sentiment, supposedly because he was a member of the imperial bureaucracy.[5] More recent scholarship has tended to doubt that this notion was conceivable to anybody living in the Roman Empire.[6] Certainly, there has been a welcome change of emphasis more recently, where comments about the consumption of Indian Ocean goods in Graeco-Roman literature are placed within the context of a moralising *topos*

1 Reproduced in Abbott (1973).
2 Magnusson (1994): 213; P. Thomas (1926): 6.
3 De Romanis (2015a): 2–3.
4 P. Thomas (1926): 16.
5 Miller (1969): 227–228.
6 See notably Sidebotham (1986): 38; Sidebotham (2011a): 246.

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that bemoaned the apparent decline in traditional Roman values.[7] These comments should be seen in the vein of anxieties about excessive elite spending on Indian Ocean goods (in terms of its impact on both one's moral character, as well as one's *patrimonium*), and not as broader concerns about the economic welfare of the Roman state.

Even though many modern scholars are more sceptical about imposing mercantilist attitudes onto Graeco-Roman literary authors, when it comes to discussing the means by which Indian goods were paid for, it has usually been assumed that the Roman Empire relied heavily upon the export of gold and silver (as coins/bullion). This is particularly the case in relation to southern India, where it has been supposed that many Indians in this region were unwilling to receive Roman wares.[8] Some have attempted to downplay this outflow by arguing that the Roman Empire had sufficient supplies of bullion and coins and lost more to other regions, like Central and Eastern Europe, but they nevertheless accept the basic premise.[9] Connected to this notion of an outflow of gold and silver is the idea that in either volume or value, the Roman Empire imported more than it exported, consequently suffering a trade imbalance with India. This is a view that has maintained its strength throughout the twentieth and twenty-first centuries, although some have questioned whether such a view can be maintained in the absence of detailed statistical evidence.[10]

It is abundantly clear from the *Periplus* and the archaeological evidence examined that gold and silver in the form of coins and crafted wares (and likely

7 Isager (1991): 223; Young (2001): 205; Murphy (2004): 97; McLaughlin (2010): 4; Sidebotham (2011a): 245–246; Sidebotham (2017a): 427.

8 See for example Warmington (1928): 271–318; Miller (1969): 216–222; Raschke (1978): 672–673; Casson (1989): 30–31; P. Turner (1989): 19–20; P. Gupta (1991): 125; Suresh (1992): 17–18; Cimino (1994): 28–29. More recently see Gurukkal (2016): 135, 230, 241, 248; Graf (2017): 496. See also McLaughlin (2014): 56, 89, 128–129, 219, who identifies both India and Arabia as draining precious metal supplies.

9 Tchernia (1995): 1003; Tchernia (2016): 239–240, 246; Young (2001): 203–204, 270–272; McLaughlin (2010): 168–169 (*contra* (2014): 191); Fitzpatrick (2011): 34, 49. Parker (2002): 75–76, notes that since such a large proportion of the 'Roman empire's gross national product was materialised in the form of gold and silver coinage' the impact of any outflow would be more limited. As early as the eighteenth century Gibbon suggested the export of gold and silver far from exhausted the Roman Empire's wealth—De Romanis (2015a): 4.

10 See for example West (1917): 47–48; P. Thomas (1926): 8; Warmington (1928): 293, 313–318; Rostovtzeff (1957): 67, 97; Miller (1969): 20, 222; Raschke (1978): 632–665, 650, 669; Singh (1988): 2, 98; Casson (1989): 17–18; Thapar (2002): 243; Strauss (2007): 251, 264; Parker (2008): 183–186; Smith (2009): 97–98; Seland, (2010): 53; Fitzpatrick (2011): 31–32, 48, 53–54. For a counterview see Sidebotham (2011a): 245–249.

also as non-coined bullion) were exported to India—so, in a sense, there was an "outflow". However, it is argued here that not only should this "outflow" not be overstressed, but also that it is questionable whether this can be so readily connected to the idea of an imbalance of trade. It is apparent when considering the practicalities involved in shipping goods to India that the space needed in a ship's cargo hold for gold and silver would have been minimal. Most of the space was taken up by goods in kind, which were not simply items of ballast but highly prized objects demanded in their own right.[11] Not only is there a lack of statistical evidence to substantiate the idea of an imbalance of trade, it is also clear that the relative importance of the export of gold and silver coins/bullion should not be overestimated. The amount of space taken up on merchants ships through the carrying of food and water supplies will also be considered below.

A Roman Trade Deficit?

Those scholars who advocate the idea that the Roman Empire suffered a deficit in its trade with India as a result of the export of gold and silver have pointed to the testimony from the *Periplus* (Roman money exchanged at a profit in Barygaza and its high demand at Muziris and Bakare), incidental comments in Sangam poems (Yavanas trading gold for pepper), and the various hoards of Roman coins found in India.[12] However, such an approach to interpreting the evidence faces a number of problems. First of all, while the literary testimony does allude to the trade of gold and silver and the archaeological evidence gives some indication of the presence and distribution of Roman coins in India, neither forms of evidence give an overall sense of the volume with which gold and silver coins were exported, nor of how significant this was in relation to the goods in kind that were exported alongside them. Secondly, none of this evidence allows us to appreciate the extent to which non-coined bullion was also exported.[13]

However, by far the most significant basis on which many scholars claim a trade imbalance between the Roman Empire and the East comes from two passages in Pliny's *Natural History*:

11 Cobb (2015a): 185–203.

12 *PME* 49, 56; Tayan-Kannanar *Agam* lines 7–11; Miller (1969): 216–217; Raschke (1978): 632–635.

13 Sidebotham (1986): 46; Sidebotham (2011a): 245; Young (2001): 205.

> And it will not be amiss to set out the whole of the voyage from Egypt, now that reliable knowledge of it is for the first time accessible. It is an important subject, in view of the fact that in no year does India absorb less than fifty million sesterces of our empire's wealth, sending back merchandise to be sold with us at a hundred times its prime cost.[14]

> But the title "happy" belongs still more to the Arabian Sea, for from it come the pearls which that country sends us. And at the lowest reckoning, India, China, and the Arabian peninsula take from our empire 100 million sesterces every year—this is the sum which our luxuries and our women cost us.[15]

Pliny's figures can be interpreted in roughly three ways. They can be rejected as entirely spurious creations of his own imagination; a vague guesstimate, which is not implausible; or, potentially, a fairly accurate rounding based upon administrative records. The problem with attempting to adopt one of these positions is that his statements create more uncertainty than they might appear to at first glance. For example, Warmington and his contemporaries debated whether these figures referred to overland or seaborne trade (or both) and whether these numbers reflected the total cost of imports or merely a trade deficit; Warmington took the view that the 50 million figure at least represented the deficit of the seaborne trade in the Indian Ocean.[16] Young speculates that these figures were based on government collation of tax records at Alexandria, where the income from the *tetarte* was collected.[17] However, this theory is complicated by the practice of the authorities exacting the *tetarte* in kind.[18] It is also possible that fluctuating prices made it difficult for the state to fix a specific rate. There is no way of knowing how much was sold on the markets in Alexan-

14 Pliny *NH* 6.26.101—trans. from Rackham (1942).

15 Pliny *NH* 12.41.84—trans. from Rackham (1945).

16 Warmington (1928): 275–276. More recently McLaughlin (2014): 191, interpreted the 100 million figure as half going to India and China and half to Arabia, based on a speculative connection to figures for incense production in the Dhofar region.

17 Young (2001): 210; see also McLaughlin (2014): 2–5, who speculates that Roman officials could have learnt this information by questioning merchants. Alternatively Tchernia (2016): 239, suggests that figure may derive from 'the sum of taxes paid on Roman exports'; *contra* Evers (2016): 82.

18 Rathbone (2000): 47. It may have been collected in kind because merchants were unable to raise the substantial cash required to pay the tax prior to selling their goods—Wilson (2015): 24.

dria and how much was shipped to state-controlled warehouses in Rome. This is a moot point in any case, since Pliny gives no indication of his sources for these figures.

Even more speculative are the attempts to assert or dismiss Pliny's credibility with reference to aspects of his career or interests. Frank, Miller, and McLaughlin positively interpret Pliny's service as a procurator and his association with the court of Vespasian as an indicator that he would have had access to such "figures".[19] Conversely, Raschke has completely dismissed the idea that Pliny was competent, or that his figures have any credible basis.[20] There is little gained in such an approach, since even if one supposes that Pliny was competent, the fact remains that it is not known if he actually did derive these figures from any source that would inspire confidence. Moreover, Pliny does not mention gold *aurei* or silver *denarii*, but refers to *sestertii* (brass coins). It should not be assumed that he had gold and silver in mind.[21]

The conclusion to be drawn here is that Pliny's 50 million or 100 million *sestertii* figures cannot be used to advance ideas of a mass outflow of gold and silver or a Roman trade deficit with the East. This does not mean that these figures lack any value, but that they may be more informative of the anxieties of the Roman elite. It is true, as Parker notes, that Pliny's statement in Book 6 is not actually negative in tone.[22] In fact, he appears to use the figure to emphasis the impressive scale of the trade. The figure of 100 million *sestertii* in Book 12, however, is emphatically moralising.[23] His emphasis on luxury, especially female luxury, as a cause of concern very much fits into the context of Roman moralising discourse of the imperial period. Tacitus, in his *Annals*, has Emperor Tiberius complain about the outflow of wealth to foreigners and enemies to pay for such luxuries, while other authors more generally complain about elite decadence. Such rhetorical tropes, while commonplace, are more likely to reflect possible anxieties about the social stability of the elite (as well

19 Loane (1938): 51; Miller (1969): 223–224; Frank (1940): 282; McLaughlin (2010): 13, 160. Salza Prina Ricotti (1994b): 103, goes as far to suggest that Pliny underestimates the reality of the money spent.

20 Raschke (1978): 634–635, 767 n. 530.

21 Sidebotham (1989): 36–37; Millar (2006): 280.

22 Pliny *NH* 6.26.101; Parker (2008): 183–184. He also suggests that the Muziris Papyrus means that Pliny's figures should not be seen as so incredible (likewise see Ruffing (2002): 361–362; Galli (2017): 6). However, the Muziris Papyrus does not reveal whether the cargo of the *Hermapollon* was acquired through barter, the sale of goods in kind, the exchange of precious metal currency, or a combination of all of them.

23 Pliny *NH* 12.41.84; Parker (2002): 73–74.

as acting as a convenient means of attacking one's enemies), than the economic welfare of the Roman Empire.[24] In fact, much of the money spent by the Roman elite would end up in the hands of merchants, financiers, and the government through taxation.[25]

The Significance of Gold and Silver as Exports

It has been argued so far that the notion of a Roman trade deficit with India cannot be substantiated by the available evidence, and that Pliny's testimony cannot be forced to support the idea of a mass outflow of gold and silver. Nevertheless, as has already been pointed out, gold and silver, in the form of coins and crafted wares, were clearly being exported. Leaving aside the latter, as fine craftsmanship that was valued more highly than its mere metallic content, it is worth considering the practical implications of transporting a mass of gold and silver Roman coins on Indian Ocean merchantmen. In doing this, it is possible to demonstrate the minimal amount of space required to transport even a fairly significant amount of gold and silver.

The methods employed here build upon previous work on this subject.[26] This includes using Pliny's figures as a basis for the amount of gold and silver coins exported by converting his *sestertii* figures into equivalent ratios of *denarii* and *aurei*. The weight of the individual coins is then multiplied by the applicable number of *denarii* or *aurei*. How much space these total weights of gold and silver will have taken up is based on estimates of the potential carrying capacity of the ships sailing from the Red Sea ports (as examined in Chapter 5), coupled with Strabo's comment about 120 ships sailing annually from Myos Hormos.[27] Many caveats have already been acknowledged, such as: the uncertainty over what Pliny's figures represent, or whether they allude to gold and silver exports; as well as whether Strabo's ship numbers hold true for various periods, and if they represent only Roman shipping. Nevertheless, in the absence of detailed statistical data, this evidence offers the best basis for the theoretical exercise undertaken here.

Pliny's 50 million figure (Book 6) is employed directly in the context of discussing the routes taken by merchants departing from Alexandria in order to

24 Tac. *Ann.* 3.53; see also Sen. *QNat.* 1.17.8–9; Juvenal 6.464–466, 509.

25 Young (2001): 203–204; Sidebotham (2011a): 245–249; De Romanis (2012a): 172. McLaughlin (2014): 19.

26 Cobb (2015a): 191–192.

27 Pliny *NH* 6.26.101, 12.41.84; Strabo 2.5.12.

reach India, and hence is the most apt for this exercise, although the 100 million figure will also be examined. Taking the Roman currency ratios of *sesterii* to *denarii* and *aurei*, we know that 50 million *sestertii* equate to 12.5 million *denarii* or 500,000 *aurei*, and 100 million *sestertii* to 25 million *denarii* or 1 million *aurei*. Prior to Nero's currency reforms in 64 CE, a *denarius* weighed about 3.9 grammes and an *aureus* about 8 grammes (almost all *denarii* in India predate 64 CE, and about two-thirds of all *aurei* do). Consequently, 25 million *denarii* equate to 97.5 metric tonnes, 12.5 million *denarii* to 48.75 metric tonnes, 1 million *aurei* to 8 metric tonnes and 500,000 *aurei* to 4 metric tonnes. If many of these coins were acquired from those already in circulation, as seems likely, this must have posed a significant organisational challenge for the Roman merchants and financiers involved in the Indian Ocean trade. To put this in context, some estimates would indicate this represents close to 50–100 per cent of Rome's annual minting capacity and one-eighth of its budget.[28]

As noted in Chapter 5, the vessels employed by Roman merchants in the Indian Ocean were very similar in design to Mediterranean vessels. It has been estimated that the average range for merchant ships operating in the Mediterranean at this period was around 70 to 180 metric tonnes in capacity, although as we have seen from the harbour dimensions at Berenike, larger-than-average ships could operate from the port.[29] Indeed, De Romanis, in his reconstruction of the Muziris Papyrus, suggests that the Hermapollon had a potential capacity of 625 metric tonnes, making it very large, but not beyond the technical capabilities of the Romans, and in line with some of the substantial grain ships that sailed between Alexandria and Italy.[30] The aetiological explanation for the size of the enormous ships from Egypt operating in the Indian Ocean, which appears in Philostratus' *Life of Apollonius of Tyana*, suggests that their potential size had captured the public imagination.[31] Not all Roman ships operating in the Indian Ocean would have been so large, but these figures do offer a useful maximum (600 metric tonnes), middling (180 metric tonnes), and minimum range (70 metric tonnes) to work with.

On this basis, a large or middling ship could accommodate even our largest estimate of 97.5 metric tonnes of silver *denarii*. Of course, it would be absurd for any single ship to carry such a quantity of precious metals. Taking this upper estimate of silver *denarii* (97.5 metric tonnes) and the minimal ship capacity

28 Duncan-Jones (1994): 33–46; Parker (2002): 75; Parker (2008): 186 (one-eighth of the budget); Millar (2004): 97 (minting of coins); see also Whittaker (2004): 171.

29 Sidebotham (2011a): 195–196; Strauss (2007): 100–102.

30 De Romanis (2012b) and (2015b). See also Hopkins (1983): xvii; Wilson (2009): 229.

31 Phil. *VA* 3.35.1–2.

TABLE 6 *Theoretical percentages of cargo space taken up by gold and silver as based on Pliny's figures*

Pliny's figures in gold and silver coins (100 million figure)	70mt ship—120 ships—average cargo space utilised	180mt ship—120 ships—average cargo space utilised	600mt ship—120 ships—average cargo space utilised
Denarii (3.9 g) × 25,000,000 = 97.5mt	1.161 %	0.451 %	0.135 %
Denarii (3.9 g) × 12,500,000 = 48.75mt	0.58 %	0.23 %	0.068 %
Aurei (8 g) × 1,000,000 = 8mt	0.095 %	0.037 %	0.011 %
Aurei (8 g) × 500,000 = 4mt	0.048 %	0.019 %	0.006 %

There are 100 *sestertii* to an *aureus*, 25 *denarii* to an *aureus*, and 4 *sestertii* to a *denarius*. One metric tonne (mt) is equivalent to 1,000 kilogrammes, a kilogramme, in turn, being 1,000 grammes (g). The totals are rounded to the nearest 1/100 of a per cent.

estimate (70 metric tonnes), distributed across 120 ships, we see that this quantity of silver would take up barely more than 1 per cent of each ship's cargo capacity, or the equivalent of one cubic metre of space. At the other end of the range, 500,000 *aurei* (4 metric tonnes) would take up less than 0.006 per cent of the space on 120 ships of 600 metric tonnes capacity (this is, of course, theoretical, since it is extremely doubtful that there would ever have been 120 ships of 600 metric tonnes capacity operating).[32] Similar methods, employed in different contexts, have also shown that gold and silver take up very little physical space on merchant ships. Gill, for example, calculated that 1,130 silver *phialai* (round shallow vessels) of 100 *drachmae* each (431 grammes) could physically be stacked upon each other within one cubic metre's worth of space—this has the silver value of 113,300 Attic *drachmae* (the equivalent in weight of c. 125,000 *denarii*).[33]

It is emphatically repeated that Pliny's figures do not necessarily represent the value of gold or silver exported. However, what this theoretical exercise has demonstrated is how little space was actually required to transport gold and silver on Roman merchant vessels. The consequence of this fact is that most cargo space on Roman vessels operating in the Indian Ocean needed to be

32 See Table 6.

33 Gill (1991): 39–40.

filled either with other goods or non-saleable ballast. The latter was sometimes deployed in the Mediterranean world, as seen from sand-filled amphorae and an inscription at Ostia mentioning dock workers loading ships with ballast.[34] Vessels engaged in the incense trade via the Red Sea and the Gulf of Aden also seem to have used non-saleable ballast on the return journey, as is attested by basalt rocks found at Myos Hormos and Berenike. It would seem that incense (alongside other items that were picked up) did not provide sufficient ballast.[35]

Ballast and Stowage

The fact that gold or silver took up a negligible amount of space on Roman ships operating in the Indian Ocean leaves us to conclude that in terms of volume, most exports to India and other Eastern lands consisted of goods in kind. This situation was exacerbated by the fact that some of the ships being utilised were larger than average, compared to those in the Mediterranean. As already discussed, one reason for this was to ensure strong, sturdy vessels that could withstand the monsoon conditions. In addition, the large size of these ships almost certainly reflects a desire to export and import substantial quantities of goods. It might be objected that even if gold and silver made up a relatively small portion of the cargo exported in terms of volume, their value still made it one of the most significant exports. There is some validity in this view, but the fact remains that gold and silver coins/bullion formed one part of a varied and valuable array of goods being exported to India and other lands on the Indian Ocean periphery.

It is important to resist the view, espoused by some, that on outbound journeys many Roman ships simply filled up their spare cargo space with items like wine or olive oil, seeing these items as merely saleable ballast with gold and silver as the main export.[36] This is a notion influenced by the persistent and erroneous claim that there was a lack of desire for Roman goods in India. Not only has it been shown that a wide variety of Roman goods, like bronze wares and highly crafted glass objects, were appreciated in India, but the practicalities involved in ensuring safe conditions on board Roman vessels precludes many of these goods being dismissed as mere ballast.

34 Peňa (2007): 80–81 (amphorae with sand); Loane (1938): 51—*CIL* XIV 448 (Ostian inscription).

35 Peacock, Williams, and James (2007): 28–70.

36 Warmington (1928): 265, 315; Fitzpatrick (2011): 50; McLaughlin (2010): 74; McLaughlin (2014): 143, 181, 187–188.

In a study about the movement of Greek painted pottery in the Mediterranean, McGrail demonstrates the point that ships do not only need ballast, but also the correct stowage of goods to ensure they do not sink in rough conditions. He makes the point that besides the total volume of the cargo or its weight, the link between weight and density is also a concern. In other words, it is important to take account of how many cubic metres of space an item takes up per metric tonne of weight. As McGrail notes, 'the inverse of cargo density is known as the stowage factor' which is used to convert known weights of cargo into stowed volumes. This allows shipmasters to calculate the position and centre of mass (ancient mariners worked on the basis of experience). When ships are loaded with items that have a high stowage factor (i.e. low cargo density), it is necessary that these are compensated by the inclusion of a consignment of material with a low stowage factor. The end result for the shipmaster is to ensure that a mixed cargo of goods is taken on board so that there is a safe freeboard (the vertical distance between the highest watertight deck and the water line) and a reasonable metacentric height (the vertical distance between ship's centre of gravity and the metacentre—the point at which, on a hypothetical line, the centre of buoyancy and gravity intersect). To make sure a ship remains stable, it needs to have a positive but not excessive metacentric height in order for it to right itself in buoyant conditions.[37]

The conclusion that McGrail draws in his article is that Greek painted pottery was not only delicate, and so had to be stowed carefully, but also needed to be balanced out by items such as metals (saleable ballast) or rocks (non-saleable ballast) because of its high stowage factor. This pottery was not taken aboard ships to act simply as ballast.[38] This consideration of stowage factors is also of vital importance when examining the items exported from the Roman Empire in the Indian Ocean. Goods like wine, olive oil, grain, clothing and textiles, spices, dyes, and glass have high stowage factors (above 1—i.e., more than 1 cubic metre is taken up per tonne of weight). It would have been necessary for ship masters to balance these items with low-stowage factor materials (i.e. below 1), like metals and stones.[39] This latter fact may in part explain why tin, copper, and lead were exported to all the major Indian ports mentioned by the author of the *Periplus*.[40] The inclusion of iron ingots and stone querns in the cargo of the shipwreck near Godavaya, Sri Lanka, may also be partly explained

37 McGrail (1989): 353–357; also Cobb (2015a): 197–198.

38 McGrail (1989): 357–358.

39 See Table 7; also McGrail (1989): 356; Cobb (2015a): 198–199.

40 See Chapter 6.

by such concerns.[41] Likewise, it should not be imagined that vessels sailing back to the Red Sea were simply filled with spices and fine textiles of cotton and silk (all high stowage goods), with a few precious gems to boot. Of necessity, some low-stowage factor goods would have been valuable for balancing these items out—one possible explanation for the Roman import of Indian steel and iron as well as Indian and Ethiopian sand, which, besides its useful properties for helping to cut marble, would have also made handy ballast.[42]

TABLE 7 *Stowage values for Roman exports and supplies*

Commodity	Stowage factors ($1\ m^3/t$)—lower	Stowage factors ($1\ m^3/t$)—higher
Metals		
Copper	0.28 (ingots) / 0.39 (ore)	0.33 (ingots) / 0.56 (ore)
Iron	0.28 (pig) / 0.33 (ore)	0.30 (pigs) / 0.42 (ore)
Lead ore	0.28 (ingots) / 0.36 (ore)	0.33 (ingots) / 0.39 (ore)
Tin	0.22 (ingots) / 0.5 (ore)	0.28 (ingots) / 0.61 (ore)
Plant and animal products, minerals and compounds		
Antimony ore/residue	0.34	0.42
Cinnabar—red ore (bags)	0.5	0.56
Clover	1.39	1.53
Coral (bags)	2.23	2.79
Crafted wares		
Earthenware (crates)	1.7	2.13
Glass-wares (crates)	2.26	3.40
Glass bottles (crates)	2.23	2.79

41 Carlson and Trethewey (2013): 9.

42 *Digest* 39.4.16.7 Marcianus 1.s. *de delatoribus*; Pliny *NH* 36.9.51–52.

Commodity	Stowage factors (1 m³/t)—lower	Stowage factors (1 m³/t)—higher
Textiles		
Hides (dry in bags)	2.09	2.23
Silk (boxes)	3.11	3.68
Textiles, fabrics, cloth	1.14 (bales) / 1.51 (boxes)	6.5 (bales) / 7.44 (boxes)
Foodstuffs and drink		
Barley (bags)	1.67	1.81
Olive oil (casks)	1.67	1.73
Wheat (bags)	1.34	1.5
Wine	1.62 (casks) / 1.67 (cases)	1.78 (casks) / 1.95 (cases)

This list of stowage values for commodities is based on lists given in Thomas revised by Flère (1970), McGrail (1989), Pepper (2012), and Cobb (2015a). Modern packing methods may be more efficient (and standardised) than was possible in the ancient world.

Crew Provisions

Beside trade goods, some space in these vessels would have been taken up by crew provisions. This would include the outbound journey itself, but possibly also provisions for an extended stay of several months at ports like Muziris, and the subsequent return journey. The possibility that some food supplies were acquired at intermediary ports or the port of final destination should not be discounted. For example, the quite numerous coconut finds at both Myos Hormos and Berenike could represent a form of provisions (providing both food and fluid) brought back to Egypt. Admittedly, this is speculative, since it cannot be known how many of these coconuts were carried in non-Roman ships, were to be consumed in the ports, or should be considered imports; although, with regards to the latter, finds seem to be confined to Egypt and there is no mention of it in any surviving Roman recipe.[43] The author of the *Periplus* makes

43 Cappers (1999): 190; Cappers (2006): 73–79 (Berenike); Van der Veen (2011): 48–49 (Myos Hormos).

a few references to the transport of grain for bartering and gift-giving in East Africa and Arabia, as well as for the shippers at Muziris and Bakare.[44] Part of this demand may have been fuelled by the desire for more familiar foodstuffs on the part of Roman merchants who were resident at foreign ports for extended periods of time.

With regard to the need for drinking water, it is likely that supplies were taken on board at each stopping point, rather than several months' worth being transported without any resupply (wine will also have formed part of the crew's provisions, and was likely mixed with the water). This can be seen from the author of the *Periplus*' description of Eudaimon Arabia. It is noted that this site has a source of water that is much sweeter than that available at Ocelis, which almost certainly reflects the fact that ships would replenish their water provisions at ports along the East African or southern Arabian coast, whether they remained in these ports or sailed to India.[45]

Gurukkal has suggested that the main weight and space on vessels travelling in the Indian Ocean would have been taken up by crew provisions and the crew themselves.[46] While crew provisions will have taken up a fair amount of space, Gurukkal's assertion is likely an overestimation. In terms of the number of crew members, armed guards and merchants travelling aboard a vessel, it was estimated in Chapter 3 that a ship of around 100 metric tonnes capacity may have carried between ten and 25 people, and larger ships of several hundred metric tonnes around 50 people. Some crew members may have slept on deck rather than below, where the cargo would have been held. Even assuming a need for seven months' worth of food (mid-July to mid-February) for 50 people, this is the equivalent of just over 14 metric tonnes.[47] On the basis of two litres of water consumption per person per day for 40 days (the amount of time Pliny claims was needed for travel between the Red Sea and the Gulf of Aden, and then from there to India), 4,000 litres of water would need to be carried at

44 *Periplus* 7, 17, 24, 28, 56.

45 *Periplus* 26.

46 Gurukkal (2016): 148.

47 The grain dole in Rome was 5 *modii* a month per adult male and probably likewise for soldiers' rations in the first century CE. Assuming a slightly more generous allowance due to activity levels of the crew of six *modii* of grain per person per month (42 *modii* = 285.6 kg), there would be consumption of about 1.33 kg of grain a day, providing (when processed) c. 4,000–4,500kcal and almost 100 g of protein. These calculations are based on figures given in Rathbone (2009). By comparison US Army Quartermaster data indicates that active soldiers require about 3,600kcal per day—Engels (1978). The more sedentary passengers will have needed far fewer calories.

each stage, equating to about 160 to 200 Dressel 2–4 amphorae.[48] This would add about four metric tonnes for the water itself, and an additional four metric tonnes when including the weight of the containers (eight metric tonnes in total).[49] This is not an insignificant amount of space, but on some of the larger ships this would only have taken up a few per cent of the available room in the hold.[50] On a smaller 100 metric tonnes vessel, with 25 crew and passengers, the food provisions might weigh around seven metric tonnes, and four metric tonnes for the water, taking up about 11 per cent of the cargo space.[51] These are merely hypothetical calculations, based on quite generous water and grain rations (the actual diet would probably have been more varied), which assume no food supplies were acquired at foreign ports. Nevertheless, they do give the sense that the vast majority (c. 90 per cent or more) of cargo space was taken up by the commodities being transported.

Summary

The long-running notion that the Roman Empire suffered a trade imbalance with India and haemorrhaged gold and silver in order to pay for its imported spices, textiles, and precious gems needs serious reconsideration. While there is evidence that gold and silver was exported, there is no way of assessing the value of this gold and silver in relation to the other goods in kind that were exported; the statistical evidence is simply non-existent. Pliny's figures cannot be used to demonstrate an imbalance of trade or a substantial outflow of gold and silver that troubled the Imperial authorities, since there is no certainty as to what they refer to, where Pliny derived these figures from, or any sense of them alluding to gold or silver exports. Even if these figures could be taken to represent gold and silver exports, it has been shown that 50 to 100 million *sestertii* worth of precious metals coins would have taken up next to no space in a cargo hold (in most calculations, less than 1 per cent).

48 Both Italian and Egyptian Dressel 2–4 amphorae could hold c. 20–25 litres. The Rhodian types was also 20–25 litres. The weight of the Amphore Égyptienne is uncertain. For amphorae capacities see archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/info_intro.cfm—accessed 1/09/2016.

49 A litre of water is equivalent to 1 kilogram.

50 De Romanis' estimation of a possible capacity of 625mt for the Hermapollon, means these provisions would represent about 3.5% of the cargo space.

51 42 *modii* = 285.6 kg × 25 = 7.14mt.

The vast majority of cargo space was taken up by goods in kind, which did not act as mere space-fillers or ballast, but as items appreciated and sought after in their own right. The distribution of many Roman crafted objects at inland sites in India emphasises this point. Furthermore, many Roman exports, like wine, olive oil, grain, clothing and textiles, spices, dyes, and glass have high stowage factors, meaning they should not be regarded simply as ballast. In fact, it would have been necessary to balance such items with those of a low-stowage factor, like metals. It is further worth stressing the challenges posed in exporting some of these items. Glassware is extremely fragile and effectively reduced to cullet if broken, while wine (among other organic products) needs to be kept cool to ensure that the product does not spoil.[52] Having considered these issues, it seems best to rethink the notion of a Roman trade deficit.

52 Peacock et al. (2006b): 70.

CHAPTER 9

The Peak of Roman Trade in the Indian Ocean

The period from Augustus up to the early third century CE (the Principate) represents, in broad terms, a high point for direct Mediterranean involvement in the Indian Ocean trade. Within this broad sweep of time, however, there were peaks and troughs. It is almost certain that there were annual fluctuations in the volume of trade, although the kind of statistical evidence that would be required to measure this does not exist for the period under study. The archaeological evidence does, however, allow us to observe a broad peak of Roman involvement in the Indian Ocean trade during the first century CE. The numismatic evidence, although controversial, may also suggest that this can be narrowed down to the second half of the first century CE. This is not to suggest that Roman participation in the Indian Ocean trade was negligible during the second and early third centuries CE, only that it may not have been taking place on the same scale.

The argument that Roman trade in the Indian Ocean peaked around the second half of the first century CE contradicts two other major positions that have been advocated by various scholars. The first position asserts that the Julio-Claudian period (30 BCE–68 CE) represented the high point for this Roman participation and for the consumption of Eastern goods. These views are dependent on the assumption that most Julio-Claudian coins were exported fairly soon after being minted.[1] It has, in fact, been argued in Chapter 7 that the late first century CE represents the peak period of Roman coin exports, especially *aurei*. The other major position avers that Roman participation in this trade continued in strength at least into the mid-second century, and that it was not until problems arose—such as the Antonine Plague (c. 165–180 CE), as well as civil unrest and banditry in Egypt from the late second century—that signs of disruption and downturn are apparent.[2] Evidence cited in support of this

1 See Sewell (1904); Bolin (1958); Lebedeva (1988); P. Gupta (1991); Tchernia (1997a) and (1997b); Suresh (1992) and (2004).

2 For those supporting the notion of a downturn around the late second or third century CE see Whittaker (2004): 166; Mukherjee (2004): 4; McLaughlin (2010): 59–60; McLaughlin (2014): 210–217; Gurukkal (2013): 183; Gurukkal (2016): 127–128. Recently Tomber (2017): 549–550, has noted that the second century CE remained a prosperous period, albeit with fluctuations and changes in regional organisation. For broader discussion of this chronology see Sidebotham

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position includes the Muziris Papyrus, the "Alexandrian Tariff", the presence of Roman soldiers on the Farasan Islands, and a number of Palmyrene inscriptions.[3] It will be demonstrated, however, that this evidence, while important, is not suitable for indicating broader trends.

Roman Participation in the Indian Ocean Trade: The Second and Third Centuries

The reasons for dismissing a peak in Roman trade in the Julio-Claudian period, based on the numismatic evidence, have already been laid out in Chapter 7. The batch pattern hoards in particular show that the export of coins peaked (at least in terms of value, if, not also, in terms of numbers) during the latter first century CE. It is now necessary to lay out the reasons for a seeming lack of comparable levels of trade in the second and early third centuries CE, and why there was a period of retraction from the high point of the latter first century CE.

One major piece of evidence often cited as proof of the strength of Rome's participation in the Indian Ocean trade in the mid-second century CE is the Muziris Papyrus.[4] As we have seen, the verso of this document reveals that the Hermapollon brought back to Roman Egypt ivory and nard (and possibly cloth), weighing just over 3 metric tonnes and valued at 1,151 Egyptian talents and 5,852 *drachmae* (after payment of the *tetarte*)—the equivalent of nearly 7,000,000 *sestertii*.[5] If De Romanis' reconstruction of the damaged parts of the text is correct then the ship possibly carried hundreds of metric tonnes of pepper as well.[6] Rathbone has even suggested that due to the careless grammar, syntax, and general sloppiness of the text, it was based on a standard boilerplate contract—the implication being that there were many other similar contracts like this one that have simply not survived.[7] This may well be the case, though it should not be assumed that, even if other equivalent documents existed, these

(2011a): 63–64, 163; Young (2001): 82–86; Van der Veen (2011): 13; Nappo (2007): 237, 243; Nappo (2009): 71; Malekandathil (2015): 358; Beaujard (2015): 20–21.

3 Muziris Papyrus—Cappers (2006); Villeneuve (2007); Whittaker (2004); the "Alexandrian Tariff"—Warmington (1928); Cappers 2006; soldiers on the Farasan Islands—Villeneuve (2007); Whittaker (2004).

4 Whittaker (2004): 21; Cappers (2006): 5–6; Villeneuve (2007): 18, 26.

5 *P. Vindob* G 40822 Verso.

6 De Romanis (2012b) and (2015b).

7 Rathbone (2000): 41.

necessarily represented equivalent sums of investment. Such a scenario is not impossible; we only lack the evidence to make such an assertion. The Muziris Papyrus is good evidence for the potentially significant sums invested in the trade in the mid-second century CE, but, in isolation, it does not reveal whether the volume of trade at this point was similar, greater, or lesser than what was seen in the previous century.[8]

A further piece of evidence, which has been interpreted as an indication of the strength of the trade in the second century CE, and even implicitly, as a sign of an increase from the preceding century, is the so-called Alexandrian Tariff. This rescript of Marcus Aurelius and Commodus, recorded in the *Digest*, lays out the duty to be paid on an array of goods at Alexandria, including many spices as well as Indian iron, eunuchs, and hair.[9] The expanding scope of the trade is inferred on the basis that of the 20 plant products specified in the "Alexandrian Tariff" only nine are mentioned in the mid-first century *Periplus* (costus, cassia, aloe, lykion, myrrh, malabathrum, long pepper, and nard).[10] The problem with attempting to compare these two texts and making an inference about the volume of trade in either period is that neither can be taken as an absolute indicator of all the goods being traded. First of all, the *Periplus* should not be understood as providing an exhaustive list of all imports and exports to particular regions. It has been firmly demonstrated from the archaeological evidence that certain items, like glass wares and gold wares, did reach India despite the relative silence of the *Periplus*. This is also the case with the "Alexandrian Tariff", which does not even exclusively concern Indian Ocean imports, but mentions goods from North Africa, the Levant, and Persia (Assyrian drugs, Persian gum, Tyrian cassia, and North African wool). Attempts to suggest that these latter items arrived via the Red Sea appear rather convoluted.[11] More importantly, while both these texts give an indication (but not an exhaustive one) of the type of goods imported in the respective periods, they in no way inform us about the volume of the trade.

The stationing of Roman troops on the Farasan Islands has also been interpreted, along with the Muziris Papyrus, as evidence for the continued significance of Roman trade in the Indian Ocean during the mid-second century CE.[12]

8 Cobb (2015a): 369.

9 *Digest* 39.4.16.6–7 Marcianus 1.s *de delatoribus*.

10 Warmington (1928): 184–185; Cappers (2006): 3–6.

11 For such attempts see McLaughlin (2010): 105.

12 Villeneuve (2007): 18, 26; see also Whittaker (2004): 21. Lo Cascio (2015): 165, even asserts that the Muziris Papyrus corresponds with a peak in trade (i.e. a mid-second century CE peak).

Nappo has even coupled this military presence with a more general interest in India seen in the literary sources (Arrian's *Indica*, *Parthica*, *Anabasis*, comments by Lucian and Juvenal, the *Geography* of Claudius Ptolemy), as well as Chinese references to an embassy in 166 CE, as evidence for an upsurge and peak in the trade from the reigns of Trajan to Marcus Aurelius.[13] Not only is this idea of a second-century upsurge at odds with the archaeological evidence, but, as shall be seen, it is questionable whether this interpretation of the literary evidence bears out. As has been noted, the literary sources are largely impressionistic rather than quantifiable. Are comments about India or Indian Ocean products really more meaningful in the writings of Juvenal (late first to early second centuries CE) and Lucian (second century CE), than those of Persius (mid-first century CE) and Martial (mid-late first century CE)? Arrian's works should be seen in the context of Trajan's desire to emulate Alexander (by no means a new phenomenon for Roman emperors), and were heavily informed by Hellenistic literary tradition (just like Curtius Rufus in the first century CE), although this is not to deny some influence from contemporary Indian Ocean activity.[14] The *Geography* of Claudius Ptolemy and the Chinese references to an embassy in 166 CE reflect the possibility that some Roman merchants ventured into the Bay of Bengal and further east, but not that this was a regular phenomenon.

As regards the Roman soldiers stationed on the Farasan Islands (specifically al-Sughra and al-Kubra) during the first half of the second century CE (at least), it has been inferred that they were there to protect the merchants from pirates and to prevent smuggling.[15] The motive of protecting merchants and combating pirates is perfectly reasonable, although broader strategic concerns are also likely to have influenced the decision to maintain a presence.[16] Nevertheless, while the presence of these soldiers may be an indicator of Roman state interest in the region (in part due to trade), it gives no quantitative information about the amount of shipping in the Red Sea in the second century CE.

The fourth major issue that needs to be considered in relation to the prosperity of the Red Sea trade in the late second and early third centuries CE is the presence of Palmyrene merchants. A few inscriptions reveal that during this period a number of Palmyrene merchants eschewed the traditional

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13 Nappo (2015): 68–71; see also Fauconnier (2012): 96.

14 Parker (2008): 147–202.

15 Villeneuve (2007): 25. See Chapter 4.

16 Speidel (2015): 96; McLaughlin (2014): 132, suggests that these soldiers monitored the Red Sea pearl fisheries and even speculates that they were protecting (post-107 CE) a tithe from a Nabataean colony in Somalia—Pliny *NH* 12.44.98.

Mesopotamian-Persian Gulf routes in favour of the Red Sea. At Koptos, a body of merchants from Hadriane Palmyra gave thanks to Zabdalas, son of Salmanos, for having paid from his own funds for the construction of *propylaea*, three *stoae*, and *thuromata* (latter second century CE).[17] A bilingual Greek and Palmyrene inscription at Dendera (c. 160–212 CE) refers to a Julius Aurelius as part of a group (συνοδία) of merchants (ἔμποροι).[18] Additional evidence attesting to the possible use of the Red Sea route by Palmyrene merchants comes from a Palmyrene wooden tablet found at Hoq on the island of Socotra, which bears a dedication from a man called Abgar and potentially dates to 258 CE.[19] Furthermore, a South Arabian inscription (c. 220 CE) mentioning two Palmyrene envoys in connection to a royal ceremony at Al Uqla (near to Shabwa) may be of relevance when considering Red Sea commercial activities.[20]

The use of the Red Sea route by Palmyrene merchants during the latter second and third centuries CE clearly suggests that profits could be made. However, one major reason that may have led some to decide to shift their focus to the Red Sea is probably the frequent conflict between the Roman and Persian (Parthian and Sasanian) empires taking place around this time. The impact of this sporadic conflict seems to be suggested by the dearth of Palmyrene inscriptions between 161–193 CE alluding to the Mesopotamian-Persian Gulf route, and the lack of reference to Charax during the third century CE.[21] The increasing presence of Palmyrene soldiers who were experts in desert warfare in the Eastern Desert in the same period is also an interesting correlation. Evidence for their presence includes an inscription set up in Berenike by a Palmyrene auxiliary soldier named Marcus Aurelius Mokimos. This was set up in honour of Emperor Caracalla (September 8, 215 CE). Two other dedications, celebrating the god Yarhibol, were set up at Koptos and Berenike around the late second to early third centuries.[22] One can only guess whether the presence of Palmyrene soldiers in the region encouraged some Palmyrene merchants

17 *I. Portes* 103; Young (2001): 80–81; Gorea (2012b): 483. Sidebotham suggests this may refer to a Palmyrene merchant headquarters—(1986): 95; and (2011a): 211–212.

18 Sidebotham (1986): 95–96; Sidebotham (1989): 487; McLaughlin (2010): 105.

19 Strauch et al. (2012): 79; Gorea (2012a): 452–453; Dridi (2012b): 461–462. Gorrea's textual reading gives a date of July 258 CE; Dridi's radiocarbon analysis indicate the wooden tablet came from a tree dating to 78–239 CE.

20 Seland (2016a): 40–41—*RES* 4909.

21 Gorea (2012b): 464–465; Young 2001: 173–175; Graf (2017): 484–485.

22 Alston (1995): 188; Alston (2007): 4; Verhoogt (1998): 193–198; Sidebotham (2011a): 63–66.

to make use of the Red Sea route.[23] In any case, the inscriptions mentioning Zabdalas, Julius Aurelius, and Abgar only reveal individual instances of trade activity by Palmyrene merchants, and do not give an overall indication as to whether the Red Sea trade route was more or less significant compared to earlier periods.[24]

Various qualifications have been offered for the evidence just examined. The idea that it can be used to suggest a comparable volume of trade with the first century CE has been rejected. This does not mean that the significance of this evidence is being dismissed—nor is it argued that the levels of Roman participation in the Indian Ocean trade and the consumption of Eastern goods during the second and early third centuries CE were negligible. Rather, it is argued that this type of evidence does not lend itself easily to determining the volumes of trade in particular periods, and that longer-term patterns can be discerned from the archaeological evidence spread across various regions as well as the numismatic evidence from India, which was discussed in Chapter 7.

Archaeological Evidence: The Dating of Roman Exports

Many archaeological surveys and excavations have been conducted at numerous international sites connected with the Indian Ocean trade during the course of the twentieth and twenty-first centuries. As has already been noted the methods employed and the degree of detail recorded can be uneven, while the intensity of excavations in different regions is varied. As a result, drawing quantitative conclusions about the volume of trade for different regions is fraught with difficulties. Meaningful comparisons can, however, be drawn when considering the statistical data for the number of finds and their dating at particular sites. This enables one to examine chronological patterns across various sites in order to determine broader overall trends. Goods that were produced in the Roman Empire and that have been found at various sites across East Africa, the southern Arabian Peninsula, and the Indian subcontinent leave the distinct impression that the first century CE was a major period of trade. By contrast, there is a comparative absence of goods dating to the second and third centuries CE. The extent to which these goods were transported by Roman or non-Roman merchants and the number of times they changed hands before

23 Seland (2016a): 42, suggests that some Palmyrene soldiers may have invested in commercial ventures being undertaken by their compatriots.

24 Cobb (2015a): 371–372.

their final disposition cannot be determined. However, the patterns observed from this material do reflect the extent to which Roman goods (or at least those archaeologically visible) were desired in broad periods.

The evidence so far unearthed from sites in East Africa shows a distinct concentration around the first centuries BCE to CE, as appears to be the case with Roman glassware and pottery at Heis (possibly the Munda of the *Periplus*), Damo, and Hafun West (possibly the Opone of the *Periplus*).[25] Roman pottery excavated at Adulis is primarily Late Antique (Late Roman 1 and 2, and especially pottery from Aila), but the Principate-era pottery dates to the first century BCE and the first century CE (particularly Dressel 2–4 and Eastern Sigillata A). Indeed, there is a marked gap between this pottery and the Late Antique pottery, the one exception being a fragment of a possible Gauloise 4 amphora (dating anywhere between 50 CE to the third century).[26]

In the southern Arabian Peninsula, the excavators working at Qana' (Kane of the *Periplus*) identified three distinct chronological phases. The earliest or "lower" period (mid-first century BCE to late first century CE) has revealed a predominance of Mediterranean imports with a very high number of Coan, Dressel 2–4, and terra sigillata (mostly Eastern sigillata) sherds.[27] In the site's heyday, the "middle" period (second to fifth centuries), the level of Mediterranean imports appears to decline, while Mesopotamian and Indian wares become comparatively more significant. Coan and Dressel 2–4 vessels largely disappear by the late first century CE, although a modest rival of Mediterranean imports (notably North African amphorae) is apparent around the late second century CE.[28] This evidence is a clear reminder that the prosperity of the Indian Ocean trade was in no way dependent upon Roman participation. The site of ed-Dur on the Persian Gulf demonstrates a similar pattern: here most of the Roman material dates broadly from the Augustan period up to the end of the first century CE.[29] Furthermore, Mediterranean glassware at Khor Rori (Moscha Limen of the *Periplus*) also dates between the mid-first century BCE and the early second century CE.[30]

25 Smith and Wright (1988): 124; Horton (1996): 447–450.

26 Peacock et al. (2007): 79–108; Peacock, Blue and Glazier (2007): 126–128.

27 Sedov (1996): 12–16; Sedov (2010b): 372, 374; Sedov and Salles (2010): 465.

28 Sedov (1996): 16–19; Sedov (2007): 76–89, 92, 104; Sedov (2010b): 374–375, 379.

29 Rutten (2007): 18–20.

30 Lombardi, Buffa, and Pavan (2008): 402. It is also worth reemphasising the point that many networks of exchange predate the "Roman" period—Coningham, Manuel and Shoebridge (2015): 32–33, 41–42.

Roman pottery (especially amphorae) forms an important body of evidence for Roman goods reaching the Indian subcontinent. Unfortunately, not all finds recorded so far have been dated, but those finds that have reveal a distinct clustering around the first century BCE and the first century CE.[31] This is certainly the case at Arikamedu, where, of the several hundred amphorae sherds discovered, most are Coan and Dressel 2–4 dating to this period (primarily first century BCE to mid-first century CE). Conversely, Mediterranean finds at Arikamedu begin to diminish rapidly during the end of the first century and the beginning of the second century CE.[32] At Pattanam, over 9,000 amphorae sherds have so far been uncovered (at the time of the 2015 season field report).[33] The main regions of the Roman Empire from which the amphorae derive include Campania (Central-Southern Italy), the island of Cos, Spain, Gaul (France), and Cilicia (southeast Turkey). Tomber notes that the majority date between the late first century BCE and first century CE.[34] The terra sigillata at this site (around 180) also largely date from the late first century BCE to the early first century CE.[35] Fabric analysis has been undertaken on the 63 Roman amphorae sherds found at Nevasa in western India (Maharashtra). The black sand fabric of these vessels is characteristic of Campania in Italy.[36] These sherds were recovered from layers dating between 25 BCE to the early second century CE, but were likely exported prior to 79 CE, since the Campanian wine industry was heavily damaged by the eruption of Vesuvius.[37]

Roman crafted objects found at sites across the Indian subcontinent likewise show a distinct pattern of dating to the first century BCE and first century CE. The Roman earthenware, glassware and bronze crafted wares from Begram were discovered in two sealed rooms dating to the first century CE, possibly latter first century, based on Whitehouse's stylistic dating of the glassware.[38] Parallels between the ribbed bowls at this site with finds at ed-Dur and Arikamedu

31 A stamp of M. Livi Caustri Sures on a Dressel 2–4 handle found in Mathura (Uttar Pradesh), most likely dating to around the late first century BCE, is an early example of Roman wine exports—Tchernia (2016): 220.

32 Begley (1996): 12, 22; Begley (2004): 9–10; Will (2004): 328.

33 Cherian (2015): 44.

34 Tomber (2015): 383–389; Tomber (2017): 543. See also Abraham (2009): 18, 21; Selvakumar, Shajan, and Tomber (2009): 35–36; Cherian et al. (2009): 236–240; Cherian (2009–2010): 154–155; Sidebotham (2011a): 191.

35 Cherian (2011): 5; Cherian (2013): 9; Cherian (2015): 44, 78, 109, 111; Evers (2016): 229–230.

36 Gupta, Williams, and Peacock (2001a): 11–14.

37 Williams and Peacock (2005): 140–148.

38 Whitehouse (1989a): 151–157; Whitehouse (1989b): 94–96; Hiebert (2011): 62–63; Mehendale (2011): 131–132, 140–143; Cambon (2011): 149, 152, 160–161.

suggest similar dating at these sites.[39] Similarities between the finds at Begram, Taxila-Sirkap, and those at Tillya Tepe reinforce the dating of the material at these sites to the first century CE.[40]

Archaeological Evidence: The Red Sea Ports and the Intensity of Occupation during the Principate

The notable decline in the number of archaeologically visible Roman goods in East Africa, southern Arabia, and the Indian subcontinent is symptomatic of a declining desire for such items by the second century CE (whether transported by Roman merchants or others). As will be shown, the level of direct Roman participation in the Indian Ocean trade may also have declined in tandem with these developments. This appears to be confirmed by the evidence for the intensity of occupation at the Red Sea ports in different periods, and the construction activity taking place in the Eastern Desert of Egypt.

Red Sea Ports

The two main ports utilised by Roman merchants engaged in the Indian Ocean trade were Berenike and Myos Hormos. The port of Berenike operated from the third century BCE all the way down to the sixth century CE. It was most intensely occupied during the first century CE. This peak was followed by a notable decline in occupation following the early second century, with a revival of the port's prosperity around the mid-fourth century.[41] This does not mean that the port was abandoned during the course of the second and third centuries, as indicated by Palmyrene activity, cartouches in the Great Temple dating to the reigns of Trajan and Marcus Aurelius, and fragments of two inscriptions dated to the reigns of Septimius Severus and Caracalla.[42] Nevertheless, the identifiable material remains, ostraka, and coins at Berenike do emphasise the high point of prosperity in the first century.[43] In the case of the coins

39 Brancaccio and Liu (2009): 222; Mehendale (2010): 131–135, 140; Cambon (2011): 152–153.

40 Cambon (2011): 160–161; Sarianidi (2011): 214; Schiltz (2011): 225–227.

41 Barnard and Rose (2007): 183; Sidebotham, Hense and Nouwens (2008): 161–162, 171–172; Sidebotham (2015b): 156. Most of the discovered ostraka at Berenike also date to the first century CE, especially the Neronian and early Flavian periods—Bagnall, Helms and Verhoogt (2005): 4–5.

42 Sidebotham (1986): 158–159; Sidebotham (2011a): 63–64, 211–212; Sidebotham (2015a): 10.

43 Bagnall, Helms, and Verhoogt (2000a) and (2000b); Ast and Bagnall (2011): 77–78 (ostraka); Kucharczyk (2011): 83–84, 91 (glassware); Osypińska (2011): 72–74 (faunal remains).

(mostly *aes* and some billon issues), 40 per cent were minted during Augustus' reign and the first century CE (mostly issues of Claudius, Nero, and the Flavians), with only 7 per cent belonging to the second and early third centuries CE (compare to the 15 per cent belonging to the Ptolemaic period).[44] Finds unearthed during the 2008–2009 seasons at Berenike also show a strong first century (especially Flavian) period concentration, or an overlap with the first into the early second centuries CE—a picture which seems to correlate with patterns seen from the numismatic evidence in Chapter 7 and with the major phase of (re)construction in the Eastern Desert, as seen in Chapter 4.[45] Interestingly the site of Marsa Nakari (possibly ancient Nechesia) also shows archaeological evidence for first century and Late Antique activity, but a dearth of second and third century finds.[46]

The port of Myos Hormos was founded during the Ptolemaic period and was eventually abandoned during the third century CE, due to silting, partial submergence, and likely as a result of wider political-economic problems in the Roman Empire (it was later used under the Ayyubid and Mamluk dynasties, when it was known as Kusayr).[47] Like Berenike, this port appears to show a process of decline during the second century CE, though perhaps less dramatic. In the harbour area, the jetty and workshops (notably iron smelting furnaces), which were used intensely during the late first century BCE and the first century

44 Sidebotham and Seeger (1996); Sidebotham (1999b); Sidebotham (2000b): 169–178; Sidebotham (2011b): 79–80; Sidebotham (2011a): 244—the fourth to fifth centuries CE make up 39% of the total.

45 For an overview of the finds from these seasons see Zych (2011): 119–162. Of the 23 terracotta oil lamp finds 22% are mid to late first century, 35% are mid-late first to early second century, and 26% that are more broadly dated from mid-first to second century CE. Of the seven wooden vessels/containers three are mid to late first century and 4 late first to early second century CE. Of the dated round-cuts, stoppers and bungs 20% (two) are mid to late first CE, 60% (six) are mid-late first to early second century CE, and 20% (two) are mid-first to second century CE. Of the utilitarian objects (tools, pegs, styluses etc.) 40% (four) are mid to late first century CE, 50% (five) are mid-late to early second century CE, and one (10%) may date around the mid-first to second century CE. Of ship-rigging, all these items are dated within the first to early second century CE. Of the datable adornments and jewellery (28 objects), 39% date to the first century CE, 50% to mid-late first to early second century CE, 11% more broadly to the mid-first to second century CE. Of the textile fragments 92% (24) are solidly first or late first to early second century, with 8% (2) broadly from the first to second centuries CE.

46 Seeger (2001): 88.

47 Whitcomb (1979): 37; Blue (2007): 265, 74–75; Van der Veen (2011): 12–13; Tomber (2016): 43.

CE, fell into disuse during the second century.[48] In the town area, with its civic and religious buildings, domestic and commercial storage areas, bakery, and waste mounds, the picture is a bit more mixed, but is broadly similar.[49] Many buildings were constructed and occupied in the first century CE but fell into disuse during the second century CE. Most of the refuse dumps also show a peak of first century CE material, although one dump has material peaking in the mid-second century (including a little third century material).[50] The finds of amphorae stoppers, ceramic lamps, brail rings, and terracotta figurines reveal a peak during the Augustan period and the first century CE.[51] Moreover, two-thirds of the classifiable coinage is Augustan or first century CE.[52]

Interpreting the Chronological Patterns

A clear pattern stands out when examining the chronology of Roman participation in the Indian Ocean trade. The archaeological remains of Roman goods in East Africa, southern Arabia, and India predominantly date to the first century CE, with a marked decline in the appearance of second century CE material. Likewise, the ports of Berenike and Myos Hormos were most intensely occupied during the first century CE, with evidence for the second-century decline present at both ports (especially in the case of Berenike). The Roman coin finds from India, discussed in Chapter 7, have also tentatively been interpreted as evidence for a peak in the latter first century CE, although the onset of a downturn during the early to mid-second century CE appears less dramatic than from the archaeological evidence.

This second century CE downturn does not mean that the trade in Roman goods and the participation of Roman merchants ceased at this point or even became insignificant. Snapshots of activity, such as the Muziris Papyrus and some of the written testimony of Palmyrene merchants, demonstrate that this was not the case. The "Alexandrian Tariff" indicates that even in periods of stress for the Roman Empire, like the periodic outbreaks of the Antonine

48 Copeland et al. (2006): 116–154, Peacock et al. (2006): 67–94.

49 C. Meyer (1982): 201–213; Copeland et al. (2006): 118, 121–126, 128–133; Peacock and Blue (2006d): 176; Tomber (2008): 61; Cobb (2015b): 403–407.

50 Copeland et al. (2006): 116–154, Peacock et al. (2006): 67–94.

51 R. Thomas (2011a) and (2011b); Peacock (2011a); Blue, Whitewright and Thomas (2011): 208–209.

52 Sidebotham (2011b).

Plague (mid to late second century CE), many varieties of Indian Ocean products were reaching the Mediterranean world (even if this rescript cannot tell us about the volume of trade). Nevertheless, it is necessary to consider why the archaeological evidence in particular shows a first century CE peak, followed by a second century CE downturn that seems to predate events such as the Antonine Plague, the massacre in Alexandria perpetrated by Caracalla, and the existential crises faced by the Roman Empire during the third century CE. The following hypotheses are based on reasoned speculation, tempered by the limits of the evidence, and are not intended as definitive resolutions to this question.

Decline in Demand

Annual fluctuations in the volume and demand for various Indian Ocean goods almost certainly existed in the Roman Empire, even if measuring this in detail is not feasible.[53] In broader terms, it is possible that a downturn in Roman demand for various items took place in the second century CE. However, the problem with such a theory is that the Graeco-Roman literary sources offer only anecdotal evidence for how Eastern goods were used and how they were esteemed in Roman society, not quantifiable information about demand. There is also the problem that many of these ancient authors often repeat the longstanding polemic about the morally corrupting effects of *luxuria*. For example, when Athenaeus claims that his contemporaries (c. early third century CE) now spend more on private banquets than used to be spent on festivals and sacrificial rites, should this be understood as just a moralising *topos* or does it reflect a genuine increase in consumptive habits?[54]

When it comes to attempting to identify demand for Roman goods in India (among other Eastern lands), the situation is even more difficult. References to Yavana goods in Sangam literature are very limited, and the dating of these texts is far from fixed, making any attempts at drawing chronological patterns from this evidence nearly impossible. The comparative dearth (but not absence) of Roman material remains in East Africa, southern Arabia, and India for the second century CE does seem to suggest, until subsequent discoveries prove otherwise, that certain archaeologically visible items were no longer so sought after. This is notably the case with the wine, glassware and metal ware exports. It is possible that organic items like textiles, minerals, and plant products were still being exported and simply do not survive in the archaeological record, but

53 See Chapter 5.

54 Athen. 6.275b.

this can only be speculation. It might also be proposed, on the basis of Roman coin finds in India—a fair number of *aurei* were still arriving in the early to mid-second century CE—that fewer goods in kind were being exported, and non-saleable ballast was increasingly being used to fill up empty space on smaller vessels. Such a situation would indicate that even if the overall volume of coins being exported was not as high as it had been in the latter half of the first century CE, the relative value of precious metal coins to other cargo exported was greater.[55] It is important to stress, again, that this is merely speculation, meant as food for thought, and is not an assessment advocated here.

Difficulties in the Eastern Desert

Besides questions of demand, the dangers and practicalities involved might have impacted on the extent to which wealthy financiers were willing to invest in the Indian Ocean trade via the Red Sea route. The latter first century CE peak in Mediterranean participation, suggested from the archaeological and numismatic evidence, interestingly correlates with a major upsurge in (re)construction activity at the *praesidia* lining the routes from Koptos to Myos Hormos and Berenike.[56] These fortified stations were maintained in order to allow the Roman military to protect stores of water for themselves and travellers, to monitor activity along these routes (preventing smuggling and banditry), and to afford protection against the sometimes hostile indigenous populations of the Eastern Desert.[57]

It is likely that one of the reasons for this increased fortification was the high level of traffic crossing the Eastern Desert during the latter first century CE. Nappo and Zerbini suggest a trade boom in the reign of Tiberius, followed by a revival under Vespasian due to the major provision of infrastructure.[58] However, it seems more likely that the major (re)fortification of the Eastern Desert is in response to high levels of trade rather than the cause of it. Increased pressure on the limited water resources of the region, coupled with the attraction of high-value caravans crossing the desert tracks, probably resulted in

55 If De Romanis' (2012b, 2015b) interpretation of the Muziris Papyrus is correct, and the Hermapollon was indeed about 625mt in capacity, then some very large ships were still operating in the second century CE.

56 See Chapter 4.

57 Cobb (2015b): 377–379.

58 Nappo and Zerbini (2011): 65—'… includes the age of Nero and part of the age of Vespasian, when the Eastern trade experienced a new revival, also thanks to the infrastructures built in the Eastern Desert by Vespasian.'

increased raiding activities by the indigenous nomads.[59] This situation seems to be reflected in the early second century CE ostraka (102/103 to 118 CE) found at the station called Krokodilo on the Myos Hormos route.[60] These ostraka include references to the theft of several camels by 18 *barbaroi*, which resulted in the injury of a cavalryman (108 CE), and warnings to be on guard against attacks.[61] There is also other evidence for hostility, including a papyrus (c. 60–94 CE) recording an engagement between the Roman military and Ethiopians and Trogodytae (the latter being another vague term for inhabitants of this region).[62]

The increasing attacks by indigenous nomads on those travelling through the Eastern Desert probably discouraged some financiers and investors. It may also have affected the types of goods being transported. The Koptos Tariff and the Muziris Papyrus make it clear that private security was hired by merchants and financiers to protect their goods.[63] This was a necessity, for although there were soldiers based in the stations on the Eastern Desert routes, the average garrison size only seems to have been about 15–24 men.[64] As noted in Chapter 4, sometimes mounted soldiers acted as escorts, but these only seem to have been a few men at a time. Given the need for increased protection, it may have made lower-value, higher-bulk items like wine less valuable to transport by camel, although their use as supplies for merchants and inhabitants of the Red Sea ports almost certainly continued. This might explain why the decline in coin exports to India in the early to mid-second century CE appears to be less dramatic than the drop in wine, glassware and metalware exports; but again, this is speculation.

Alongside an emboldened attitude of the *barbaroi*, a possible decrease in traffic along the Koptos-Myos Hormos and Koptos-Berenike routes may be one of the reasons why there was increased raiding activity further north in the Eastern Desert by the mid to late second century CE. Ostraka from Mons Claudianus and Umm Balad allude to the threat posed by the nomads, who seem to have been tempted to raid the supply caravans going to these sites (the nomads will have been interested in the camels and the supplies, not the quarried stone

59 It is possible also, as Murray and Warmington (1967: 29) suggest, that the increasing use of camels by indigenous groups led to a greater capacity to raid.

60 Brun (2006b): 61–71.

61 Cuvigny 2005: 36—K534 (raid by barbarians), 96—K694 (be on guard). See Table 3.

62 E. Turner 1950:—Papyrus 40 'della raccolta Milanese (Collezioni del Castello di Milano)'.

63 *OGIS* 674; *P. Vindob* G 40822 Recto, Column 2 Line 2–4.

64 Cuvigny (2006c): 307–310.

objects).[65] Wilson has suggested that one of the reasons why the duty rate for eastern imports went from 25 per cent (*tetarte*) to 12.5 per cent (*octava*) by the time of Alexander Severus is that private traffic was weakening, and the Roman state was no longer able to offer the same level of protection.[66] Perhaps a lower tax rate was, rather, intended to entice merchants to participate in the Red Sea trade.[67]

The Importance of the Persian Gulf

A third major possibility for the decreased intensity of occupation at Berenike and Myos Hormos and the decline in (archaeologically visible) Roman goods reaching India, Southern Arabia, and East Africa may be the increased importance of the Persian Gulf route. Both the Red Sea and Persian Gulf routes were likely always operating concurrently. Indeed, the existence of both routes allowed Eastern goods to reach the Mediterranean at different markets. In the case of the Red Sea route, goods would reach Alexandria and then be transported to other ports linked to this major hub; likewise, some merchants would have come to ports in or near the Gulf of Aqaba, subsequently reaching Gaza (possibly via Petra). With regards to the Persian Gulf route, goods would be brought via Mesopotamia to places like Palmyra or Zeugma before reaching the ports of Syria.[68] Goods coming through these routes would also reach the Mediterranean markets at slightly different times of the year, around late spring for the Persian Gulf route and possibly around late spring, but more likely around mid-summer, for the Red Sea route. This may have helped mitigate price fluctuations in the Mediterranean for these Eastern goods.[69]

Due to the dearth of evidence, it is difficult to confidently assert which of the two routes was more or less significant in terms of the volume of traffic at various points in the early centuries CE. That one route or the other saw more traffic at a particular period is not, however, inherently implausible. It is notable that

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65 *O. Claud.* Inv. 4888 (c. 145 CE), 7309 (c. 152/153 CE), 7226 (c. 150–190 CE), 7255 (c. 189 CE), IV 851 (end of second century CE); *O. Ka. La.* inv. 31. See also *P. Bagnall* 8 (186/187 CE).

66 Wilson (2015): 27–28—the last reference to the *tetarte* dates to 174 CE, and the earliest for the *octava* to 227 CE (*Codex Justinianus* 4.65.7).

67 Sidebotham (2016): 915–916, has observed that it is a 'chicken-and-egg' argument as to whether lucrative private commercial activity encouraged the Roman state to promote it further or whether state interest encouraged participation. He has also noted that this reduction in the tax rate could be reflective of a decline in the overall level of trade by this period.

68 Young (2001).

69 Seland (2011); Cobb (2014).

Palmyrene activity via the Mesopotamian-Persian Gulf route, to judge from the epigraphic evidence, saw a prosperous phase during the early to mid-second centuries CE, probably aided by decreased Romano-Parthian tensions at this time (c. 120s to early 160s CE).[70] The better-documented medieval and early modern periods reveal that the relative significance of the Red Sea and Persian Gulf routes could fluctuate. For example, the decline of the Abbasid caliphate and the rise of the Fatimid caliphate in the early centuries of the second millennium CE led to a shift in economic importance from Baghdad and Damascus to Aden and Fustat—that is to say, the Red Sea route rose in importance while the Persian Gulf route waned.[71]

The hypothesis that the Persian Gulf route became more significant around the early to mid-second century CE while traffic in the Red Sea lessened would offer an explanation for the apparent decline in direct Roman participation in the Indian Ocean trade, but allow for many Eastern goods to still reach the Mediterranean world. Mesopotamian torpedo jars, almost certainly transported via the Persian Gulf, were reaching sites in India during both the later Parthian (1–224 CE) and Sasanian (224–651 CE) periods, indicating that this route was perhaps faring better.[72] The aforementioned decline in the proportion of Mediterranean wares and the predominance of Mesopotamian and Indian wares at Qana' from the second century CE may also be indicative. Furthermore, the rise of Axumite power in the third century CE could also be seen in the context of smaller Roman merchant ships, fewer in number, increasingly relying on ports like Adulis to act as hubs for goods coming from further afield.[73] This speculative idea is offered for consideration, and should not be taken as a definitive assertion.

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70 Gorea (2012b): 472; Gregoratti (2015): 140; Graf (2017): 485, 496–497. Seland (2016a): 68, 78, cautions that these inscriptions commemorate incidents in which things nearly went wrong, but that the assistance of members of the Palmyrene elite (and in one case the Roman army) saved the day. Whereas when things went smoothly or a camel caravan was lost, a commemoration is less likely to have been made. He does, however, broadly note the expansion of Palmyrene trade networks during the second and early to mid-third century CE.

71 Chaudhuri (1985): 58.

72 Tomber (2007b): 974, 977–982; Krishnan and Balvally (2015): 245–246. Torpedo jars also appear at Ras Hufun in Somalia, most likely dating between the third to fifth centuries CE—Smith and Wright (1988). See also major port re-foundations by the Sasanids in the Persian Gulf by Ardashir—Malekandathil (2015): 359; Salles (2016): 153–155.

73 Strauch (2012): 375.

CHAPTER 10

Conclusion

The present study has examined the nature and development of Roman trade in the Indian Ocean from the period running between 30 BCE to the early third century CE. This has included scrutiny of the range of goods traded, the sailing routes and schedules, financing and organisational structures, the identities of those who participated and the vessels they sailed on. Consideration has also been given to chronological developments, as well as the Roman state's interest in facilitating private (and possibly state) commercial interests in the Indian Ocean.

Any investigation of this type necessarily has to engage with a vast array of evidence—literary, archaeological, epigraphic, papyrological, and numismatic—connected with various cultures spanning Europe, Africa, and Asia. This body of material has increasingly expanded due to the significant amount of archaeological work done over the last few decades. The intention of this study has been to analyse much of this new material, as well as re-examining a number of longstanding assumptions about Roman participation in the Indian Ocean trade, some of which go back a century or more. Furthermore, through the adoption of a number of quantitative approaches, it is hoped that many aspects of the schedules, logistics, and chronology of this trade may be reconsidered. An overview of this study's major conclusions is set out below.

The Development of Roman Trade in the Indian Ocean

A number of important developments took place during the Ptolemaic period, such as the creation of infrastructure, the mapping out of trade routes and utilisation of the monsoon winds, and the integration of Egypt into wider Indian Ocean trade networks. When Octavian (Augustus) annexed Egypt in 30 BCE a bourgeoning trade was already in existence, not one stifled by Ptolemaic government monopolies. To be sure, this was modest compared to what followed, when the volume of trade expanded rapidly, reaching new heights by the first century CE thanks to a stable and peaceful Mediterranean world. These stable and peaceful conditions offered numerous opportunities for investment. The willingness of the Roman state to further develop the Red Sea port facilities and continue the Ptolemaic practice of offering protection along the Eastern Desert routes was an additional boon. The opportunities for profit encouraged

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a number of individuals and groups across the Mediterranean world to invest, including wealthy Italian mercantile families. However, this did not lead to the displacement of the Alexandrian-Egyptian elite as key investors in the trade, or to the marginalisation of Graeco-Egyptian merchants and sailors.

Schedules, Practicalities and Roman Diasporas

Many features of typical Graeco-Roman business practice were also employed by Roman merchants in the Indian Ocean. These included the establishments of partnerships, the use of agents by wealthy investors, and the use of maritime loans to reinvest capital and to spread risk. The types of vessels employed in the Indian Ocean by Roman merchants also followed Mediterranean precedents. These merchants had to adhere to a tight schedule dictated by the rhythms of the Southwest and Northeast Monsoon winds, setting out from the Red Sea ports in July and often returning around February to March. In general, it was possible to sail between Egypt and ports in East Africa (above the Horn), southern Arabia and India within a year. However, the western Indian Ocean and the Mediterranean were two separate trading spheres and it is very likely that the volume of goods exchanged between these spheres fluctuated annually, exacerbated by factors such as piracy, banditry, bureaucracy, corruption, and losses at sea.

Many Roman merchants who sailed to India will have conducted their business within the few months between late September to early January before undertaking their return journey. Nevertheless, some of the more powerful and wealthy financiers may have employed agents or partners who would remain in key foreign emporia for longer periods of time. These individuals would have been able to engage with local contacts, gather useful information, and assemble goods in advance. A range of literary, epigraphic, and archaeological material can be cited in support of this view, though its interpretation can prove controversial. Most notably, references to Yavanas in Indian texts and inscriptions need to be treated with a great deal of caution.

Indian Ocean Goods and Roman Society

Indian Ocean goods were frequently employed by various individuals in the Roman world, especially the elites, to advertise and enhance their social status. This activity was often censured by self-styled moral conservatives who repeated long-standing invectives against *luxuria* and its morally and finan-

cially destabilising effects. The use of many of these Indian Ocean goods in cuisine, medicine, and religious and funerary rituals has encouraged some scholars to regard them as necessities in the Roman world. While there is some value in this categorisation, such a view can belie the frequently complex and multifaceted ways in which these goods were understood. In many cases, the manner in which they were used defies the mutually exclusive categorisation of luxury or necessity.

A related question has also been asked in this book: how far down the social scale were some of these goods being consumed and with what frequency? In the case of spices and aromatics, there are reasons to think that some of these plant products, like black pepper and incense, were consumed by a much broader spectrum of people within the Roman Empire. An analysis of living standards and wages that can be gleaned from the sporadic evidence of the period of the Principate, and more concretely from the data in the *Edict of Maximum Prices*, strongly suggests that groups like rank-and-file soldiers, high-skilled craftsmen, and those engaged in "professions" (for example scribes and teachers), possessed the surplus income required to make regular, if modest, purchases of items like black pepper or frankincense. In the case of the black pepper, the importance of urban and military consumption of this product is confirmed from archaeobotanical finds at a number of sites that were part of Roman territory (or were occupied by Roman soldiers). Thus the import of Indian Ocean goods should not be seen solely in terms of satisfying the demands of a small group of elites.

Barter and Bullion

It has been demonstrated from an analysis of the written and archaeological evidence that a wide range of goods flowed between the Mediterranean world and various Eastern lands connected via the Indian Ocean. This included a host of foodstuffs, raw materials, heavy bulk items and low-weight high-value products. The array of items being exchanged was due both to demand and the necessity of ensuring that ships had proper ballast and stowage for stability. High stowage factor goods like wine, glassware, fabrics, and spices were balanced out by low stowage factor goods like metals. This belies the claim made by some scholars that there was little demand for Mediterranean goods in places like southern India. The archaeological evidence in particular reveals that various Mediterranean crafted wares (bronzes and glassware) and wines were appreciated across the Indian subcontinent. Certainly, gold and silver were exported, and, at least in terms of value, these metals will have been sig-

nificant items of trade. However, in terms of volume, gold and silver would have taken up a negligible amount of cargo space. The hypothetical examination of Pliny's 50 million and 100 million *sestertii* figures make this apparent.

The Peak Period of Roman Trade

It has been possible to identify two distinct positions with regard to the peak period of Roman participation in the Indian Ocean trade. One view holds that the Julio-Claudian period saw a peak in trade. This is largely on the basis of numismatic evidence (the very high preponderance of Julio-Claudian coins in India) and references to Roman consumptive habits in this period from the literary sources. The second view asserts that Roman participation remained strong and steady until the latter second century or early third century CE when events like the Antonine Plague and Third Century Crisis caused a significant downturn. Based on an examination of the archaeological and numismatic evidence, it is has been argued that the first century CE, especially the latter first century, in fact represents the peak of Roman participation in the Indian Ocean trade with a modest downturn taking place from the early second century CE.

Afterword

This study has focused on Roman participation in the Indian Ocean trade and its placement within a wider historical and cultural context. While this participation was significant, Roman activity was not the sole catalyst for the development of international trade in the Indian Ocean, nor did the complex networks which developed inherently depend on this participation. Economic and cultural links had been developing within India and between the lands connected by the Arabian Sea and Bay of Bengal for centuries (if not millennia) prior to the Augustan annexation of Egypt.

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